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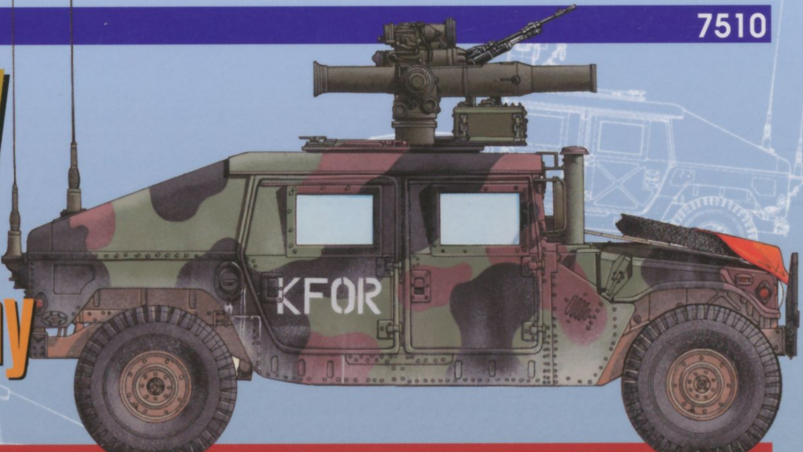
7510

HMMWV

Workhorse of the US Army

Carl Schulze



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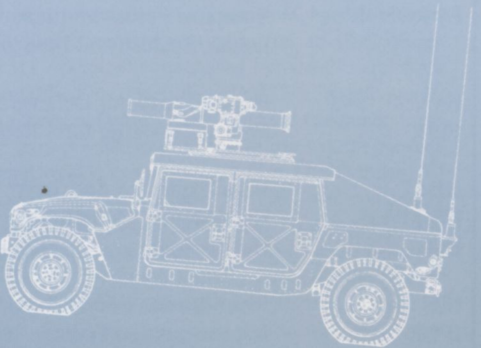
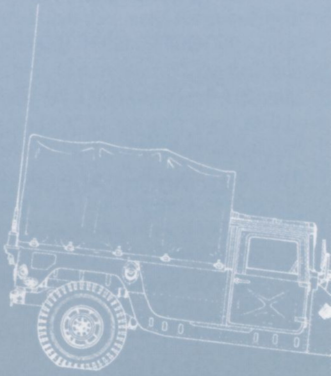
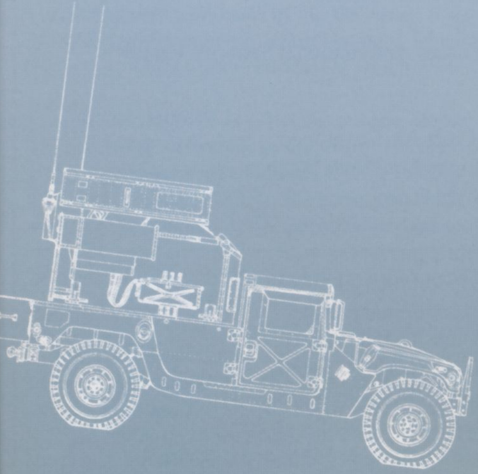
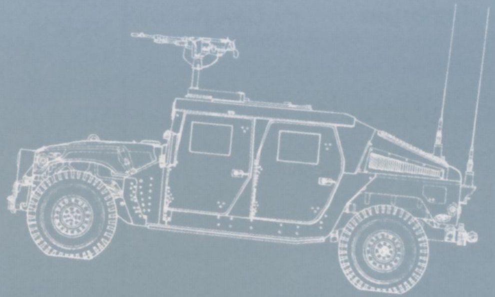
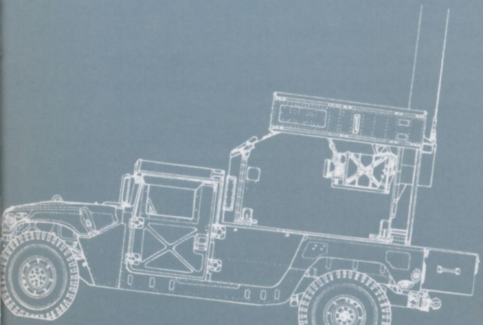
Text and photos by Carl Schulze
Illustrations by Hubert Cance

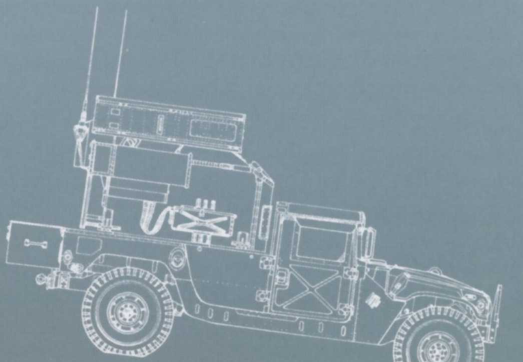












Editor: James R. Hill
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by CONCORD PUBLICATIONS CO.
603-609 Castle Peak Road
Kong Nam Industrial Building
10/F, B1, Tsuen Wan
New Territories, Hong Kong
www.concord-publications.com

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ISBN 962-361-676-7
printed in Hong Kong

Acknowledgements

First of all I would like to thank my wife Britta for supporting my work wherever possible. For the support with additional pictures and information I have to thank very much the following persons and companies: Michael Jerchel, Walther Böhm, Yves Debay, Daniel Nowak, Craig C. MacNab from AM General Corporation, Herrn König from MOWAG Motorwagenfabrik, Bob Skinner from Alvis Plc. and O'Gara - Hess and Eisenhardt.

Abbreviations

ABCT	Airborne Battalion Combat Team
ACU	Assault Craft Unit
AP	Armor Piercing
APC	Armored Personal Carrier
AMF(L)	Allied Command Europe Mobile Force (Land)
BMP	Boevaya Mashina Pekhota (Armored Personal Carrier)
BITE	Built-in Test Equipment
CTIS	Central Tire Inflating System
DIVAD	Division Air Defense
ECV	Expanded Capacity Vehicle
EUROFOR	European Force (Multinational Force: French, Italian, Spanish and Portuguese)
FAADS	Forward Area Air Defense System
FLIR	Forward Looking Infra Red
HEAT	High Explosive Anti Tank
HMMWV	High Mobile Multipurpose Wheeled Vehicle
HQ	Headquarters
IFF	Identification Friend or Foe
IFOR	Implementation Force
IFV	Infantry Fighting Vehicle
KFOR	Kosovo Forces (International Security Forces in Kosovo)
LCAC	Landing Craft Air Cushioned
LOSAT	Line Of Sight Anti Tank Weapon
LOS-R	Line of Sight Rear
MBT	Main Battle Tank
MEF	Marine Expeditionary Force
MEU	Marine Expeditionary Unit
MNB(E)	Multinational Brigade (East)
MNB(S)	Multinational Brigade (South)
MND(N)	Multinational Division (North)
MND(SE)	Multinational Division (South East)
MPLA	Movimento Popular de Libertacao de Angola
MRE	Meal Ready to Eat
MUTT	Military Utility Tactical Truck
PMS	Pedestal Mounted Stinger
REFORGER	REturn FORces to GERmany
SAM	Surface to Air Missile
SETAF	Southern European Task Force
SFOR	Stabilization Force
SOC	Special Operations Capable
TACOM	Tank, automotive and Armaments Command
TACP	Tactical Air Control Party
TOW	Tube-launched Optically tracked Wire command link guided missile
UAE	United Arab Emirates
UNITA	Uniao Nacional para Independencia Total de Angola
USMC	United States Marine Corps
VCP	Vehicle Check Point

In March of 1983 the US Army Tank, Automotive & Armaments Command signed a US $1.2 billion contract with the AM General Division of LTV Aerospace, which today is the AM General Corporation. The mission was to produce 55,000 M998 Series High Mobility Multipurpose Wheeled Vehicles, in short HMMWV. These were to be delivered in five basic variants and 15 different configurations over a five-year period. Of the 55,000 vehicles produced, the US Air Force received approximately 1,100, while 11,000 went to the USMC and the remainder to the US Army. This contract, and the introduction into service in 1985 of the first of more than 150,000 HMMWVs, marked the beginning of its popularity, which is topped only by that of the legendary Jeep.

Development and Production

Design work for the M998 series began in mid 1979 and was based on a US Army draft specification for a High Mobility Multipurpose Wheeled Vehicle. The US Army had several requirements for the new vehicle including high mobility and cross country capability, reliability, the ability to be used in a variety of roles and durability. It also had to be lightweight, easy to maintain and adjustable to varying climates. AM General's first prototype, which was completed in August 1980, was a weapon carrier configuration and was based on an FNC design known as the XR311. The XR311 design was purchased by AM General from FNC and was subsequently modified to meet the HMMWV requirements. Together with prototypes from Chrysler Defense and Teledyne Continental, the AM General XM998 prototype project underwent intensive trials in the Nevada Automotive Test Center with each vehicle covering more than 17,000 miles. All of the designs passed the tests successfully and in July 1981 all three contenders were issued contracts for an additional eleven prototypes. Next in 1982, the operational and development testing was conducted over a five month period at several locations. These included the Aberdeen Proving Grounds, the Marine Corps base at Camp Pendleton and the Navy Amphibious Base at Coronado, California. In March 1983, after decisions were made due to test results and budgetary restrictions, the AM General M998 HMMWV design was chosen to become the new workhorse of the US Army. It was during that extensive testing that AM General named its entry Hummer, which later also became the name of the civilian version of the HMMWV, which debuted in 1992.

The HMMWV was officially introduced into service in 1984 with the first vehicles being delivered to the Army in 1985. They subsequently exercised contract options for an additional 15,000 vehicles with a total of 70,000 vehicles being delivered by 1989. In the same year, in an additional multiyear contract worth US $1 billion, the US Army ordered an additional 33,000 HMMWVs. Of these, the first were delivered in January 1990 and the last were delivered by 1995. During this time, the production had changed from the basic M998 version to the modified M998A1 series. Another contract for 1,200 vehicles was given to AM General in 1994, followed by yet another order for 8,800 in 1995. Delivery for both was completed by 2000. These last two contracts included vehicles of the further improved M998A2 series as well as the M1114 Up-Armored version. Both the US Army and the US Air Force ordered an additional 738 M1114s in 1998. This was followed by an additional order, by the US Air Force, for 71 vehicles of the M1116 Up-Armored HMMWV version in 1997. These first HMMWVs that were delivered to the US Army in 1985 began to replace a wide range of vehicles. These included most of the US forces fleet of M151 Ford MUTT (Military Utility Tactical Truck), all M274 _-ton Mules, all M561 1_-ton Gama Goats and some of the fleet of M880 1_-ton pick up trucks.

Series and versions

In 1985, production began on the M998 at the AM General plant in Mishawaka, Indiana. Since then, there have been more than 150,000 vehicles produced. These include all variations of the M998, M998A1, M998A2 and the M1113 Expanded Capacity Vehicle. They have been delivered to the US Armed Forces and over 30 different countries. These include Abu Dhabi, Algeria, Bahrain, Bolivia, Chad, Columbia, Djibouti, Ecuador, Egypt, Honduras, Israel, Japan, Jordan, Kuwait, Luxembourg, Mexico, Philippines, Qatar, Saudi Arabia, Slovenia, Switzerland, Taiwan, Thailand, Tunisia, Turkey and Venezuela. The original M998 series was delivered in 15 configurations such as cargo/troop carriers, weapon carriers, ambulances and shelter carriers. The vehicle soon became a base for further modifications, which were often carried out by the purchasers, sub-contractors or even the troops in the field. This makes it impossible, even for the official spokesman of AM General, to give exact details on how many versions exist today. AM General itself, provides HMMWVs with the following armament provisions: Mk.19 40mm Automatic Grenade Launchers, .50 cal M2HBs, Giat 20mm M621 Cannons, M106 Recoilless Rifles, GAU-19 .50 cal 3-barrel Gatling Guns, 30mm ASP-30 Cannons, 5.56mm and 7.62mm General Purpose Machine Guns, Milans, TOWs and TOW II Anti Tank Missile Systems, Prime Movers for M101, M102, M119 Howitzers and Anti Aircraft Missile Systems like Mistral and Starburst. Foreign companies also used the HMMWV chassis as a platform for their own vehicle designs, such as the MOWAG Eagle reconnaissance vehicle of the Swiss company MOWAG or the Offensive Action Vehicle Shadow designed by British manufacturer Alvis Plc. In addition to their outstanding mobility and cross country capability, most of the HMMWV versions can be air transported or deployed by conventional air-drop or Low Altitude Parachute Extraction Systems. For example, three HMMWVs fit into a C-130 Hercules, six into a C-141B Starlifter and 15 can be transported in a C-5A Galaxy. The HMMWV can also be transported by helicopter as an under slung load. Two can fit under a CH-47 Chinook or CH-53E Super Stallion or one under a UH-60A Black Hawk.

A Brief Operational History

The HMMWV has seen combat action several times in its service history. The first was during "Operation Just Cause", the US invasion of Panama in December 1989. In Panama, HMMWVs were deployed with nearly all units, with most of them belonging to the 82nd Airborne Division and the USMC. The next time the HMMWV saw operational service with US Forces was in August 1990, when they were deployed in the Saudi Arabian desert after the Iraqi invasion of Kuwait. In the spring of 1990 HMMWVs were used by the western backed UNITA rebel forces in Angola. They were used in the fighting that took place in order to stop an offensive of the Soviet backed MPLA government forces. While it is still a mystery how many and by which ways these HMMWVs made their way to Angola, previously published pictures prove that they used versions fitted with TOW and 106mm recoilless rifles and at least one was fitted with a Russian anti-aircraft gun. By early 1991 when "Operation Desert Storm" marked the liberation of Kuwait, HMMWVs were deployed with almost every US unit involved in the conflict and in every existing variant. In the first days of the deployment, spearhead units such as the 82nd and 101st US Airborne Divisions, as well as the USMC, relied totally on the heavy weapons mounted on their HMMWV armament carriers. They also relied on the support of combat helicopters, artillery and the airforce to counter a possible Iraqi invasion into Saudi Arabia. "Operation Desert Storm" also marked the first operational deployment of a new HMMWV variant: The first Boeing Aerospace Avenger Air Defense Missile System was spotted among the approximately 20,000 deployed HMMWVs.

The next time HMMWVs were seen in action was in December 1992, when US Forces took part in "Operation Restore Hope" as part of the UN Forces in Somalia. Nearly all HMMWV variants then in service were used during this operation. Another nation that deployed its peacekeepers with HMMWVs to Somalia was Kuwait (see Concord Publications No 2014 UNITAF in Somalia for further information). In December 1995, after deployment via Hungary to Croatia, US Forces crossed the Sava as part of IFOR in order to bring peace to the country that was shaken by civil war. With them they brought a huge fleet of HMMWVs which have since became a common sight throughout Bosnia, but in particular in the MND(N) sector around Tuzla. During the first few years of that deployment HMMWVs were normally seen patrolling in convoys of no less than four vehicles, of which at least one was armed with a heavy weapon. For security purposes no single vehicle was allowed to leave any US base on its' own. In December 1996, IFOR became SFOR, but the mission of the force remained the same and only the markings on the vehicles were changed. In addition to US forces, HMMWV and HMMWV based vehicles were used by other distributing nations of IFOR and SFOR including both Morocco and Luxembourg. To date, there still remains a huge number of HMMWVs based with the remaining SFOR troops in Bosnia. However, this was not the last time the HMMWVs were to be deployed in the Balkans. Again US Forces of the Army and the Marine Corps were involved when KFOR troops crossed from Macedonia into Kosovo on the 12th of June 1999. While the first HMMWVs deployed into Kosovo belonged to the USMC 26th MEU, these were later followed by HMMWVs belonging to the 1st Armored Division, the 1st Infantry Division as well as from airborne units such as the 2nd Bn., 505th Airborne Regiment of the 82nd Airborne Division. In the past, patrolling was conducted with M2 Bradley IFV and LAV-25 wheeled APCs, however today, most of the work is done by the large HMMWV fleet including the latest armored version the M1114. Also seen on Kosovos roads are HMMWVs belonging to the forces of Morocco, the United Arab Emirates, Luxembourg and the MOWAG Eagle of the Danish Army.

At the time of publication, the latest deployment of the HMMWV was with the USMC 26th MEU operating in Afghanistan. However, it is almost certain that this will not be the last in the operational history of the HMMWV. It is only a matter of time before one of the over thirty user nations will be involved in some type of military operation that will require the versatility of the HMMWV.

The M998 HMMWV Series

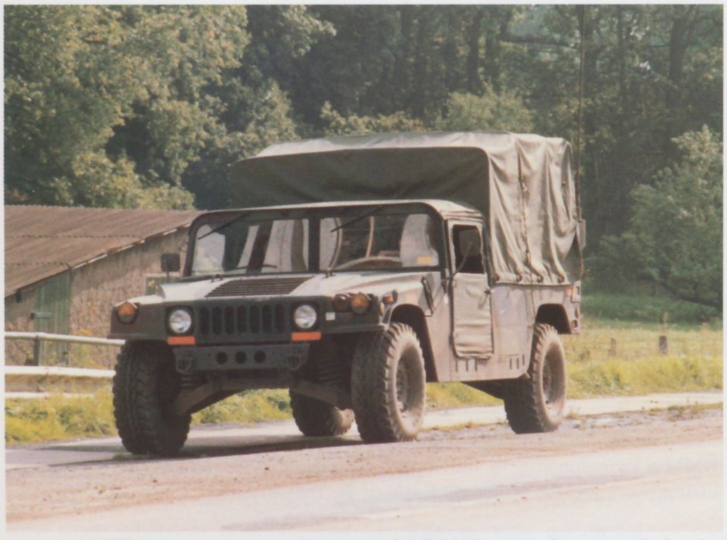
The M998 was the first series of the HMMWV to be produced. Production started at the AM General production plant at Mishawaka, Indiana, in early 1985. In 1993 the production was changed to the M998A1 Series HMMWVs and by this time well over 100,000 chassis were manufactured. According to a US Army source the inventory of the US Army alone was 89,486 vehicles.

The box frame of the HMMWV is made out of high-grade alloy steel with five heavy-duty cross members. Each steel component is E-coated, which substantially reduces corrosion from the elements. The vehicle body is composed of aluminum because it is lightweight and resistant to corrosion. The body panels are riveted and glued together in order to make it easy to change the vehicles configuration. For the security of crew, in addition to the roll bar, the windshield frame of the vehicle is strong enough to add protection in case the vehicle rolls over. In the basic version seats are arranged so that there are two on each side of the drive train while the cargo bay is situated in the rear. The General Motors 6.2 liter air-cooled V-8 diesel engine is mounted in the front of the vehicle and can be accessed by a forward lifting hood. Power transfer occurs via a General Motors Hydromatic THM 400 three-speed automatic transmission with three forward and one reverse gear and the 2-speed full time four wheel drive transfer box. AM General designed a geared hub assembly and mounted this together with the drive shaft and differential high up in the chassis, which provides protection from rough terrain and adds to the ground clearance of 0.41m. The HMMWV has double A arm independent front and rear suspension with coil springs and hydraulic double action shock absorbers which allows for good maneuverability and easy handling. A further improvement to this was the addition of a front stabilization bar attached to the lower control arms and pivot bracket. In addition to outstanding cross country capabilities, the HMMWV has a low center of gravity due to its wide wheelbase. The length of the vehicle also makes it more stable during off road driving. The four wheel disc brakes are mounted inboard close to the differentials, which are located between the frame rails, protecting the brakes and differentials from debris. Also found in the HMMWV are: a heater system for the crew compartment, power steering, a shielded engine radiator, seat belts and windshield washers. For cost effectiveness the HMMWV uses many standard automotive components including the engine, brakes, steering, transmission and transfer case. For the same reason, and for easier logistical support, the front and rear drive shafts, front and rear suspension carriers and front and rear axles are identical. The HMMWV was officially introduced into service in 1984 and by September 1985 the first vehicles were delivered to the Army's 9th Infantry Division. The second unit to receive HMMWVs was the 7th Infantry Division. In Germany the first units to receive HMMWVs were the 3rd Infantry Division and the 2nd Armored Division (Forward).

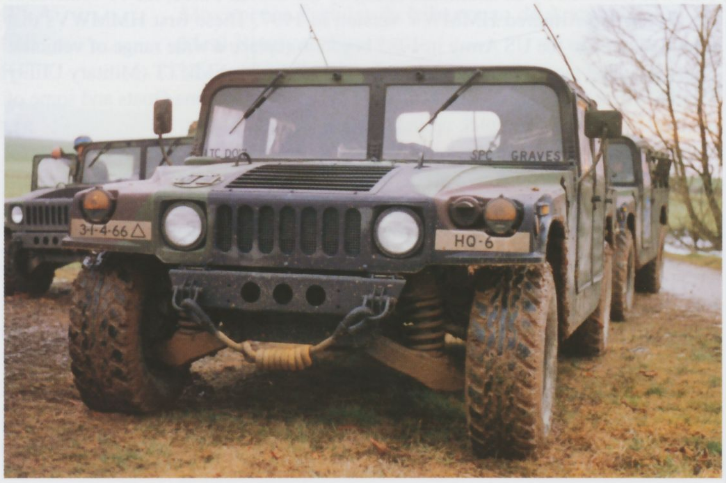
The M998 HMMWV Series consists of the following versions:

- M998 Cargo and Troop Carrier
- M1038 Cargo and Troop Carrier with winch
- M966 TOW Missile Carrier with basic armor
- M1036 TOW Missile Carrier with basic armor and with winch
- M1045 TOW Missile Carrier with supplemental armor
- M1046 TOW Missile Carrier with supplemental armor and with winch
- M1025 Armament Carrier with basic armor
- M1026 Armament Carrier with basic armor with winch
- M1043 Armament Carrier with supplemental armor
- M1044 Armament Carrier with supplemental armor with winch
- M997 Maxi-ambulance for four stretchers with basic armor
- M996 Mini-ambulance for two stretchers with basic armor
- M1035 Soft Top Ambulance for two stretchers
- M1037 Shelter Carrier
- M1042 Shelter Carrier with winch
- M1069 Prime Mover
- M1097 HHV (Heavy Hummer Variant), a modified version of an armament carrier with increased gross vehicle weight

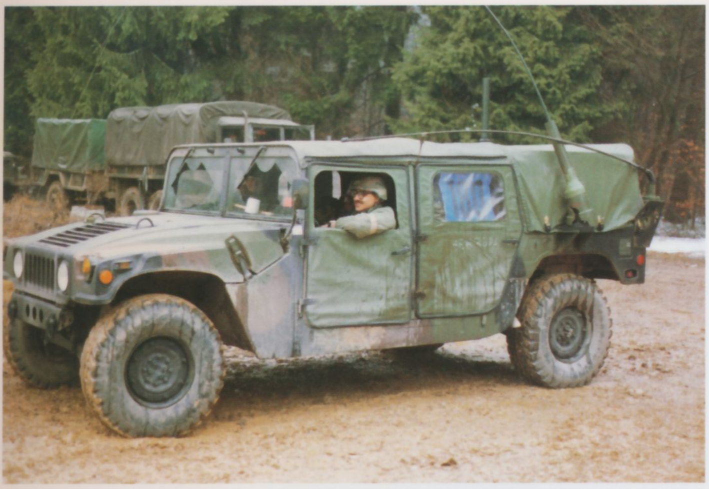
The M998 and the M1038 has either two or four doors and can be fitted with a soft top enclosure. Armament carriers such as the M1025, M1026, M1043 and M1044 were delivered with application kits to fit .50 cal M2 HB machine guns, M60 machine guns and Mk.19 automatic grenade launchers. Also included in the M998 HMMWV Series is the Boeing Avenger which uses the M1037 shelter carrier as a platform for an air defense system that incorporates the Stinger missile and a .50 cal machine gun. A second Stinger missile vehicle, which was based on the M998 cargo and troop carrier, was fitted with racks to hold the equipment of the Stingers shoulder launcher. In addition to the production vehicles, a huge number of experimental versions and prototypes were produced. These included the HMMWV with Hellfire, the Line Of Sight Anti Tank Weapon (LOSAT), a 20mm and 30mm cannon, Mistral, Starstreak, a remote controlled HMMWV, a HMMWV wrecker and so on. AM General also developed a lightweight truck on the HMMWV chassis by positioning the crew cab over the front of the engine.



In NATO's central front in Germany, HMMWVs were first seen in larger quantities during the REFORGER exercise "Certain Strike" in September 1987. This M998 is fitted with the two-man soft top and is used in the pick-up configuration. The high canvas tilt cover is used over the rear compartment. Note that on the driver's side, the window, which is made out of soft transparent plastic, is open and easily closed by a zipper.



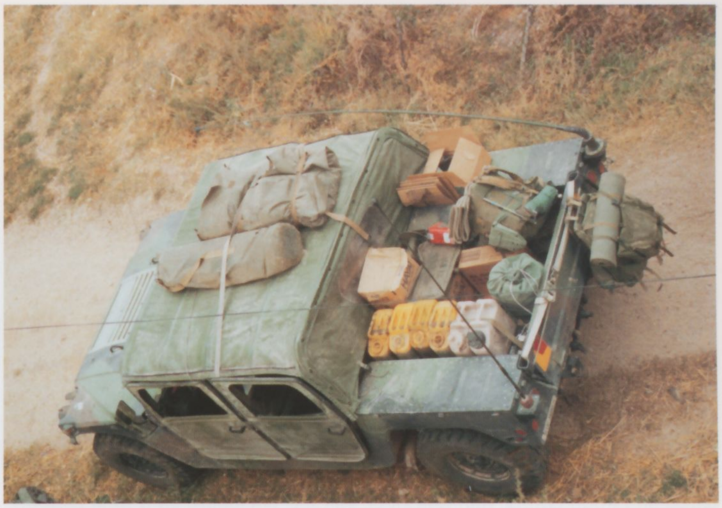
The M998 cargo and troop carrier is the most commonly seen version of the first HMMWV series. The vehicle in the picture is the basic configuration with a soft top enclosure, four seats and four doors. It can be identified by the vehicle code as a vehicle of the HQ Company of the 4th Battalion, 66th Armored Regiment of the 3rd Infantry Division. Taken during the REFORGER 1990 exercise "Centurion Shield", the picture clearly illustrates the 2.18m width and 1.83m height of the vehicle. This provides a low center of gravity and adds to the vehicle's cross country abilities.



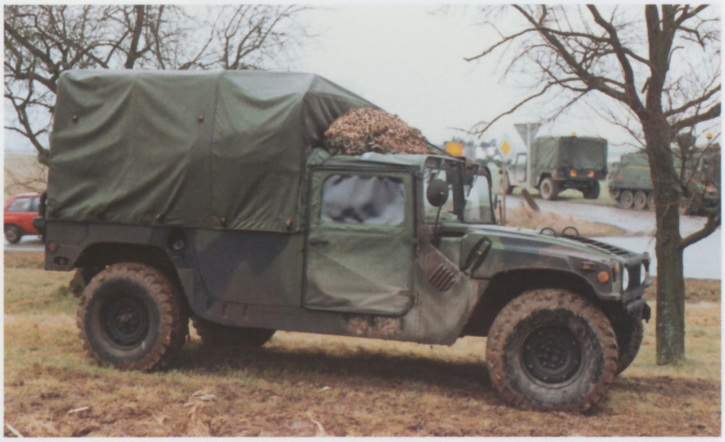
This M998 belongs to a Tactical Air Control Party (TACP) deployed during the REFORGER exercise "Centurion Shield" in 1990. It is equipped with the soft top enclosure, four doors and the extended tilt has been added. The TACP vehicles are fitted with additional communications equipment such as long-range HF radios, which are needed to direct combat aircraft to their targets on the ground. Radios in the HMMWV are usually mounted between the driver and front passenger on a rack below the windshield. Additional radios can also be mounted in the rear of the vehicle. Power for the radios is supplied by the 24-volt electrical system. Note the antenna mounts on the vehicle's side and rear.

Technical data M998 Series HMMWV (M998 cargo and troop carrier)

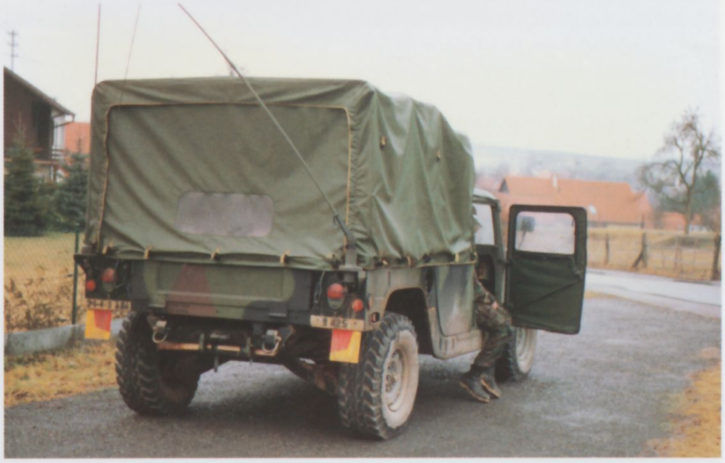
Engine type:	General Motors 6.2 liter V-8 Turbo diesel engine.
Horsepower at 3,600 RPM:	150 HP
Maximum speed:	105 km/h
Curb weight:	2,359 kg
Payload:	1,134 kg
Gross vehicle weight:	3,493 kg
Maximum towed load:	1,542 kg
Fuel tank capacity:	94 liters
Seating capacity:	1 + 3
Wheelbase:	3.3 m
Overall length / width / height:	4.58m / 2.18m / 1.83m
Track width:	1.82 m
Ground clearance:	0.4 m
Turning radius:	7.62 m
Angle of approach:	69° degrees
Angle of departure:	45° degrees
Acceleration:	0 km to 48 km in 7 seconds 0 km to 80 km in 20 seconds
Cruising range:	563 km
Fording:	0.76 m with extra kit 1.52 m
Transmission:	General Motors THM 400 three speed automatic transmission coupled to a 2 speed full time four wheel drive transfer box
Wheels and tires: capacity.	16.5x 8.25, wheel with 1,747kg Tires are 37x 12.5 R 16.5 LT load range "D" radial with low profile run flat device on two piece take apart wheel. Flat run capability is 48 km
Suspension type:	Independent double A frame with open end coil springs and hydraulic shock absorbers
Brakes:	Hydraulically actuated, four wheel inboard mounted power disc brakes with dual reservoir master cylinder.



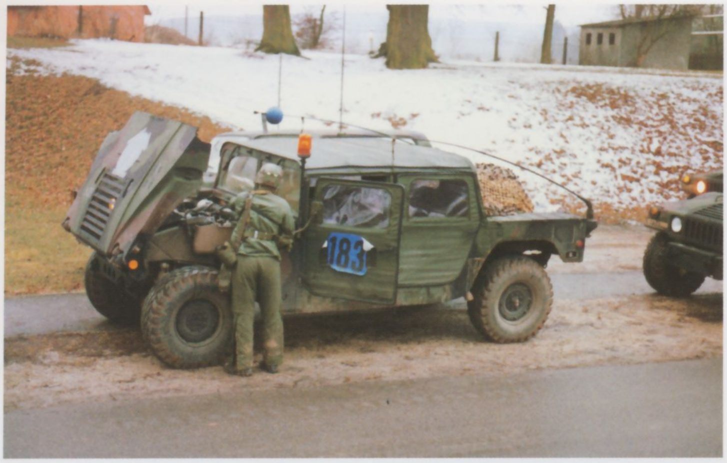
When used in the basic configuration the M998 allows the crew to carry a large amount of supplies in the vehicle cargo compartment. If required, an additional extension tilt can be added to protect the equipment from varying weather conditions. The vehicle pictured here belongs to the 3/325 Airborne Battalion Combat Team, which was based in Vincenca, Italy and formed part of the South European Task Force.



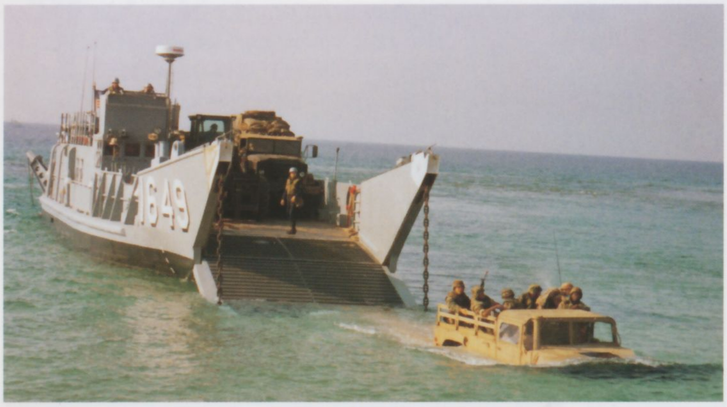
This side view of an M998 cargo and troop carrier with soft top and two door enclosure shows the high tilt over the rear compartment. This is used when the vehicle is configured for a troop transport role. In the rear of the vehicle, wooden seats and backrests are mounted for troop transport and the high tilt provides sufficient room for more comfortable travelling. Note the uncommon round mirror on the passenger side, which was probably mounted after the original square one was accidentally destroyed. The picture was taken during the REFORGER 90 exercise "Centurion Shield".



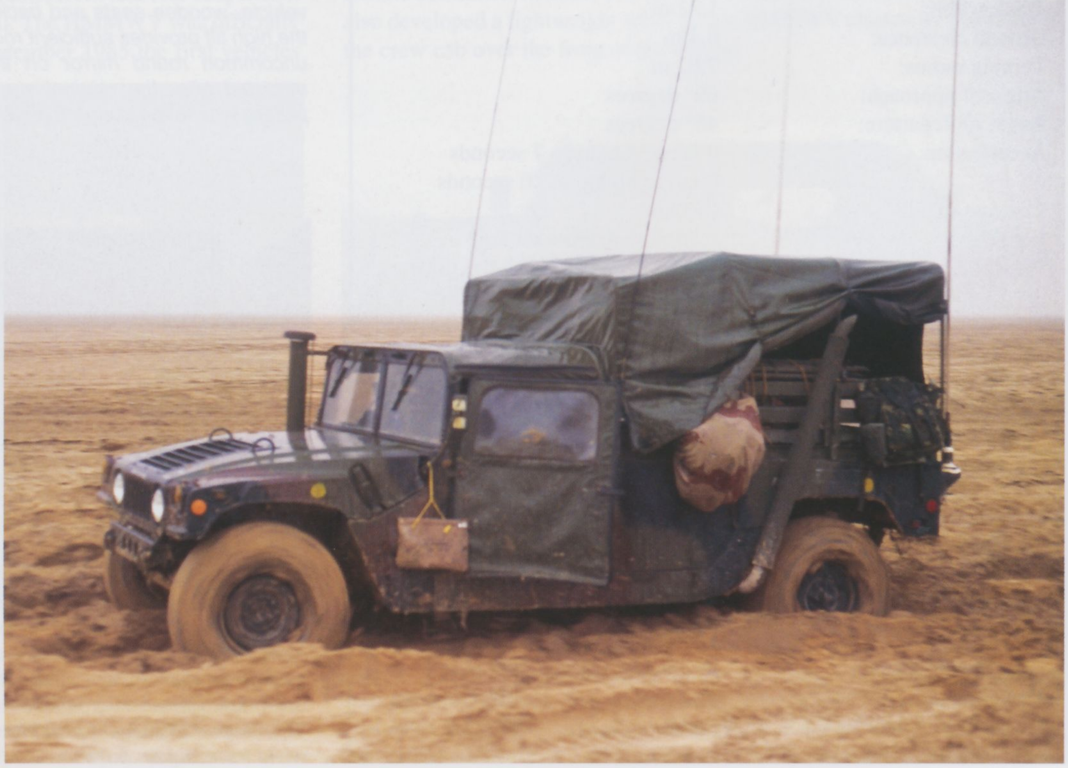
The rear view of the same M998 clearly illustrates the transparent plastic window in the rear cover of the tilt. Note the antenna mounts on either side of the rear of the vehicle. The red and yellow panels below the vehicle unit markings were introduced in the mid 80s to all vehicles in the US Army. This helped to prevent accidents with civilians by providing higher visibility while travelling on public roads.



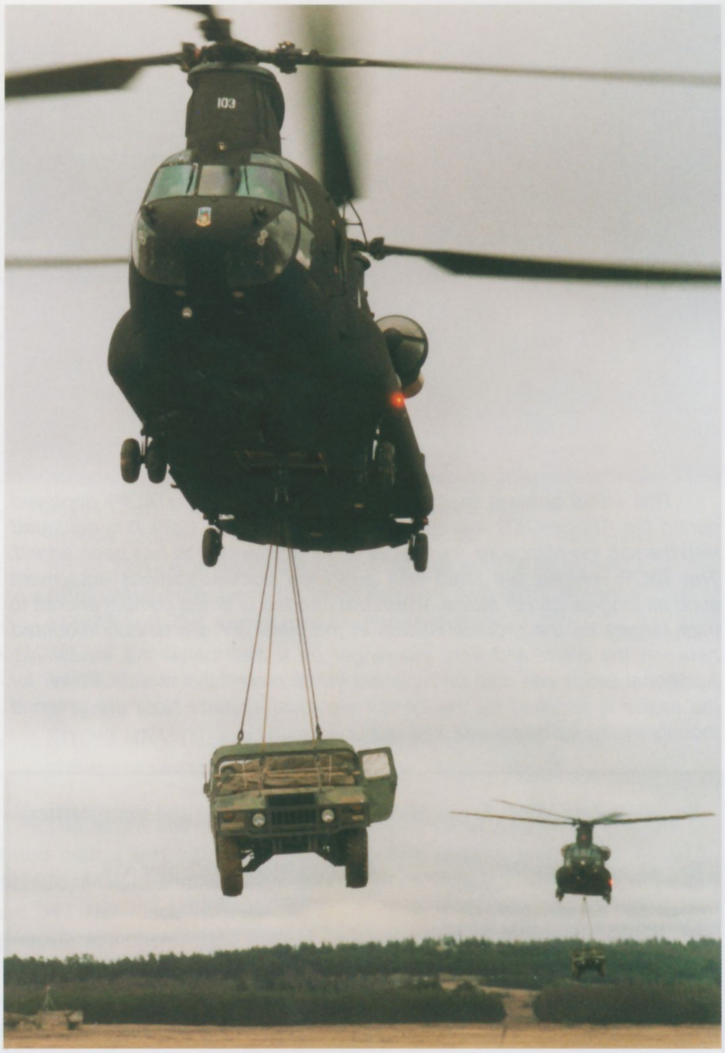
The blue nerve ball on the antenna of the vehicle identifies this M998 cargo and troop carrier with four door soft top enclosure as a tank platoon. This system was used during the REFORGER 90 exercise "Centurion Shield" which was a huge command post exercise. For daily maintenance the vehicle bonnet is raised which in the case of the HMMWV is done by opening the two clips at each side and then lifting the hood. Note the radiator grill baffles in the bonnet that protect the radiator against damage by debris.



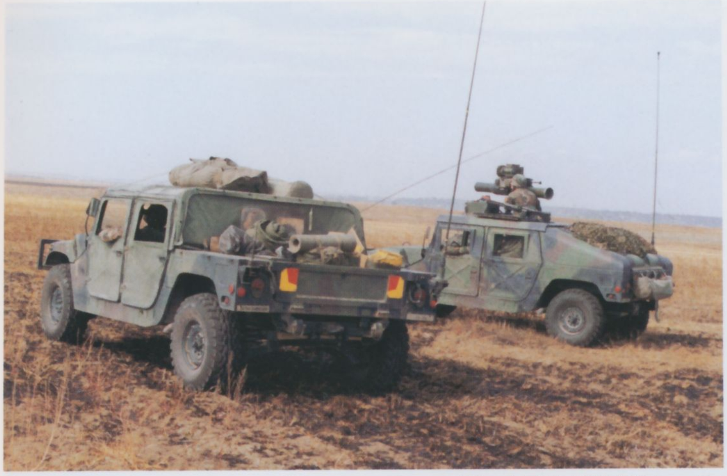
With an additional kit, the fording capacity of the M998 HMMWV vehicle series is raised from 0.76m to 1.52m. All vehicles of the USMC, like the M998 pictured here, are fitted with this kit. This includes an extended air intake pipe and extended exhaust pipe. When used in this troop carrier configuration the vehicle is fitted with wooden benches and back rests in order to allow eight troops to travel in the back. This vehicle belongs to a Beach Master Unit and was seen during the exercise "Determination Display" in Turkey in 1992. The vehicle is painted in desert camouflage, due to the fact that the Beach Master Unit is responsible for the organization of the beachhead and does not normally leave the sandy area of the coastline.



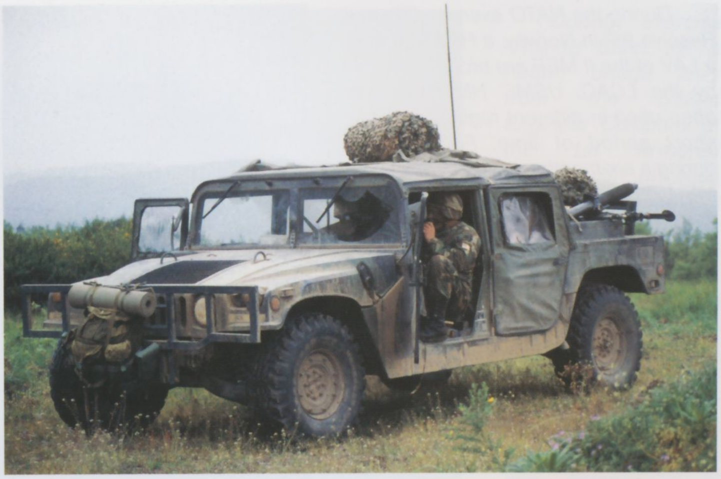
The weather during operations "Desert Shield" and "Desert Storm" was far from what was expected in the desert. Heavy rains made the sand wet, slippery and muddy, a terrain in which the HMMWV excelled. Here an M998 cargo and troop carrier with two doors and soft top enclosure from the USMC can be seen forcing its way through the muddy desert. Note the extended exhaust pipe, which is typical for the USMC. (Yves Debay)



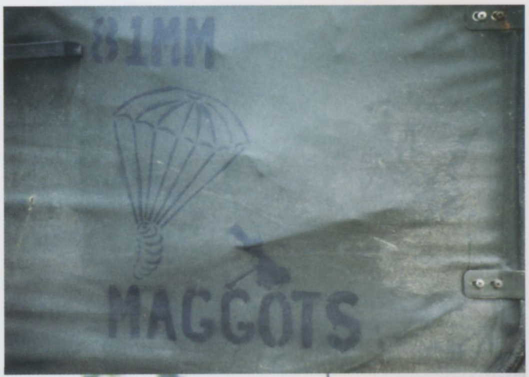
The HMMWV can also be transported by helicopter as an underslung load. Two can be carried under a CH-47 Chinook or CH-53E Super Stallion or one under a UH-60A Black Hawk. Here a CH-47D Chinook lifts an M998 from the 3/325 ABCT "Blue Falcons" during an exercise in southern Germany in 1992. (Walter Böhm)



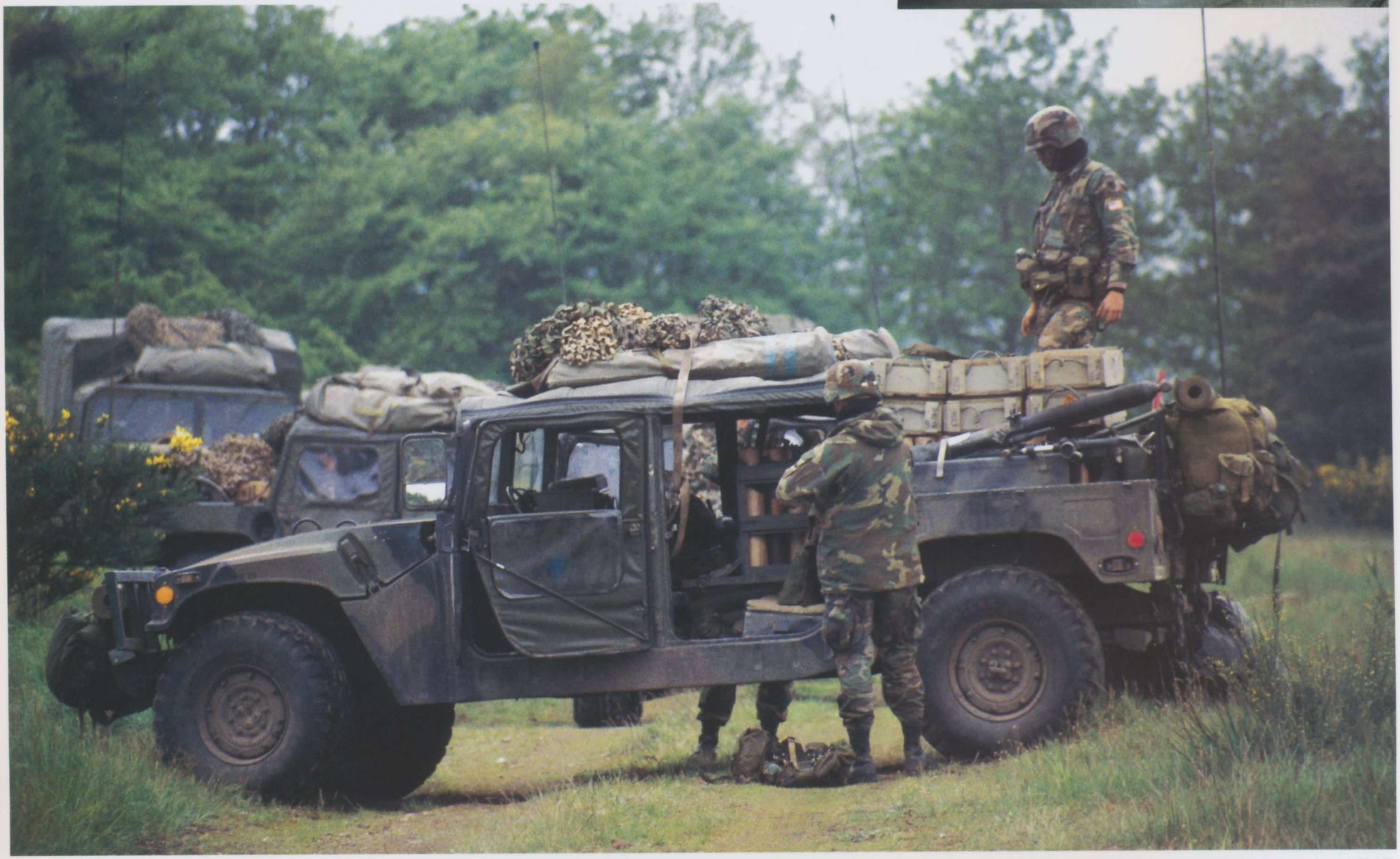
In this picture the two different versions of the M998 HMMWV series can be seen. The vehicle in the foreground is an M998 cargo and troop carrier and pictured behind it is an M966 TOW missile carrier with basic armor. The M998 is fitted with a soft top and canvas doors with windows made out of transparent plastic. In contrast to this, the M966 has a hardtop enclosure, solid doors with the distinctive X shaped pattern and windows that can be slide up and down. Both vehicles belong to the 3/325 Airborne Battalion Combat Team and were seen during the exercise "Alley Express 92" in October of 1992.



This M998 cargo and troop carrier with four door soft top enclosure is used as a mortar vehicle by an 81mm M252 mortar team. The vehicle belongs to the mortar platoon of the 3/325 Airborne Battalion Combat Team and was seen during the annual AMF(L) artillery exercise "Ardent Ground" on the Baumholder Training Area in Germany in 1994.

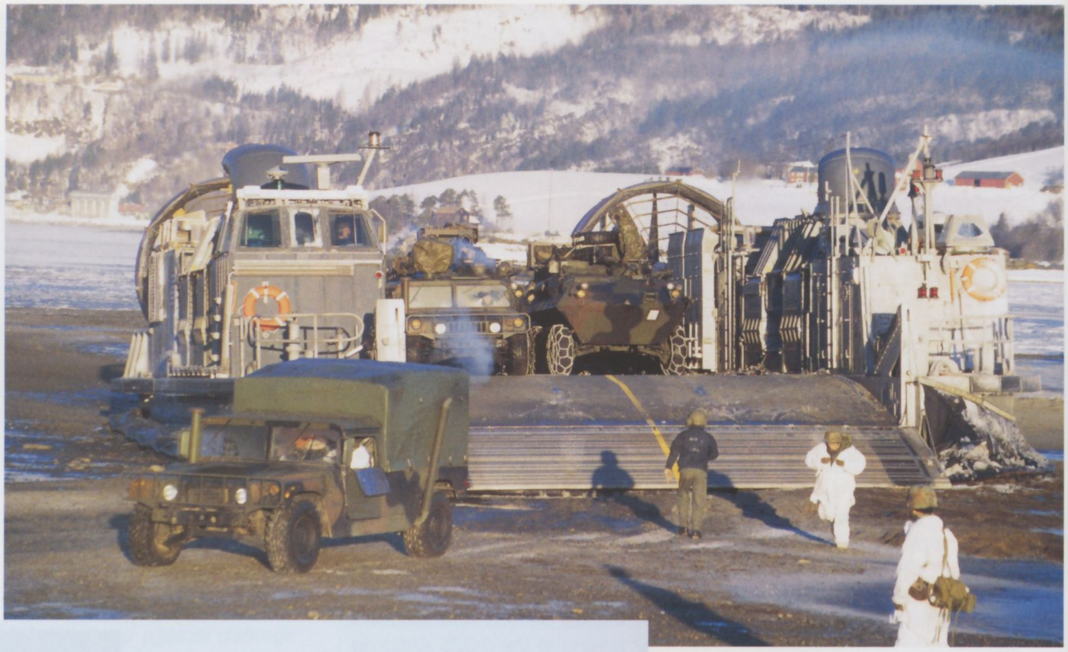


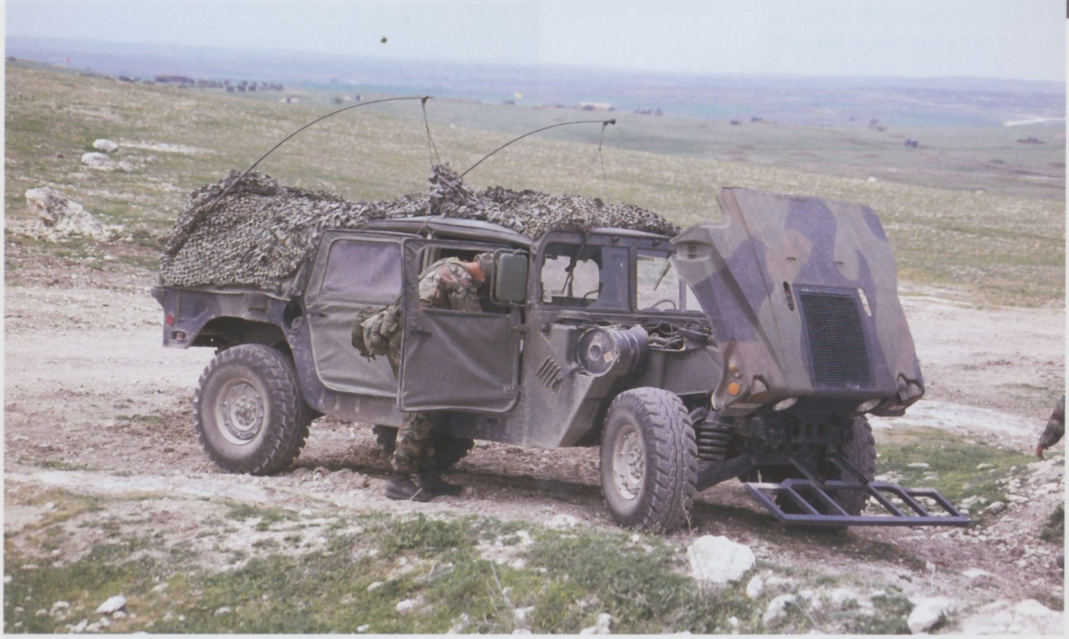
The mortar platoon from the 3/325 Airborne Battalion Combat Team has the nickname "Maggots" which can be seen painted on one of the platoon's HMMWVs together with an airborne maggot.



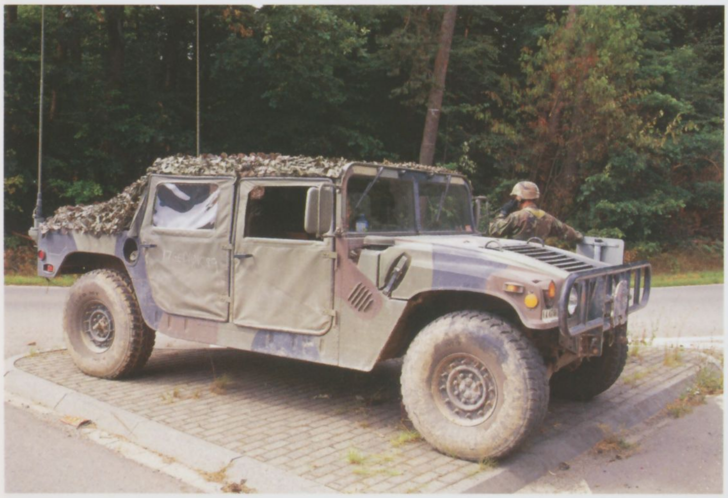
This M998 cargo and troop carrier with four door soft top enclosure is being used as a mortar vehicle by an 81mm M252 mortar team from the 3/325 ABCT. Shown between the rear seats is an ammunition rack. Note the huge number of wooden boxes that have been loaded. They contain spare 81mm rounds.

During the NATO exercise "Strong Resolve 95" in Norway, a HMMWV and a LAV of the II MEF are brought ashore by the LCAC. USMC HMMWVs are often used in different regions within a short period of time. For example during a six-month sea deployment of a MEU, the unit's HMMWVs might first see action for a few weeks on an exercise in Norway and only two weeks later might be brought ashore in Egypt or Saudi Arabia for exercises or operations in the desert. However, unless they were damaged in an accident the author has seldom seen a broken-down HMMWV, a testament to the remarkable reliability of the vehicle.

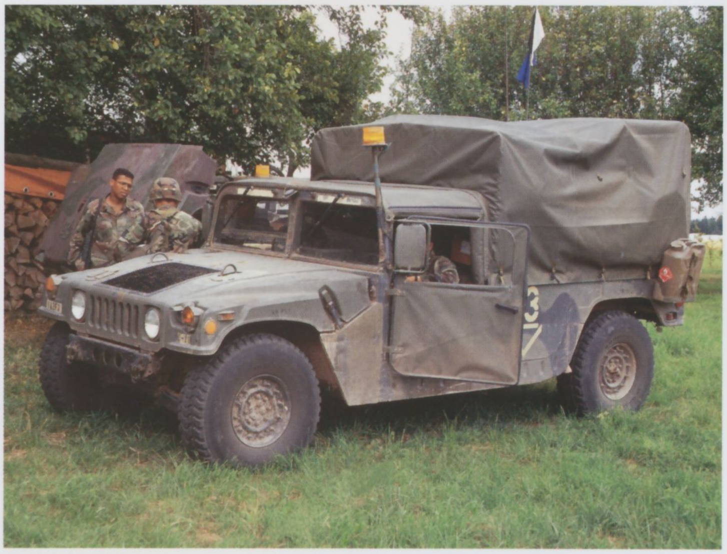




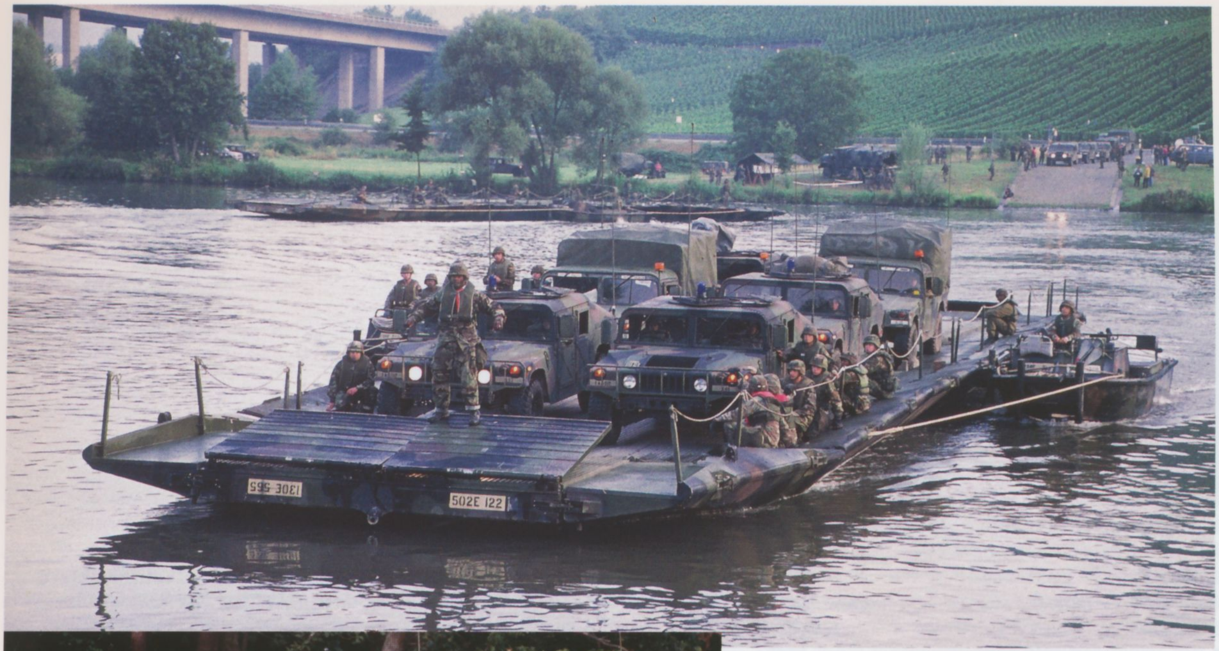
Seen in Turkey during the AMF(L) exercise "Ardent Ground 97", this M998 cargo vehicle with four doors and soft top enclosure belongs to the 319th Airborne Field Artillery Regiment. It is common for HMMWV crews to open the hood in order to stop the sun from reflecting off the windshield. Note that in order to open the hood, the brush guard has to be lowered.



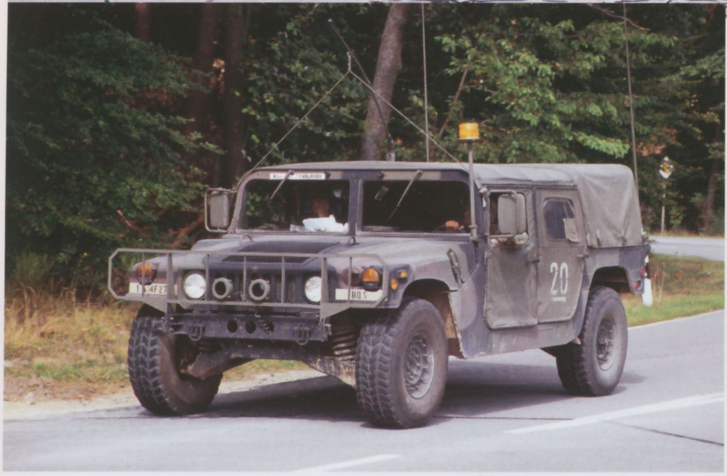
Here an M998 cargo and troop carrier with soft top enclosure, four seats and four doors of the 47th Forward Support Battalion can be seen during exercise "Rolling Steel 99". The vehicle is one of the countless M998 HMMWVs that were upgraded to the A1 standard and can be identified by the mounting for the old mirror. The later lorry-type mirror is fitted to the windshield. Note that the vehicle has not been refitted with the new grill as seen with a huge number of refitted M998 series vehicles.



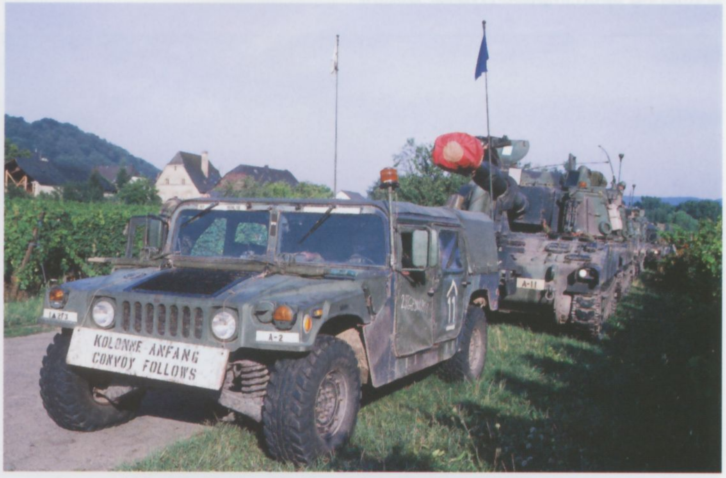
This M998 cargo vehicle with high tilt was seen during the Divisional Artillery exercise "Rolling Steel 99". It belongs to the 2nd Battalion, 3rd Field Artillery Regiment based in Giessen, Germany. The soft doors consist of a metal frame covered with flexible plastic and are common in the crew cab. Note the open window in the left door, which is made of transparent plastic.



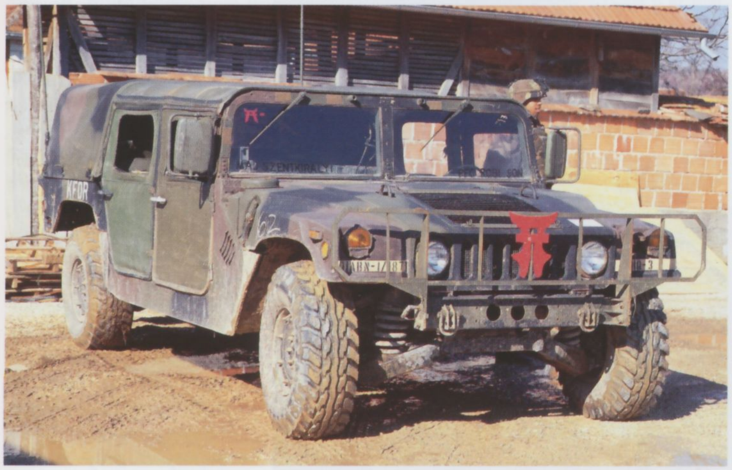
During exercise "Rolling Steel 99" a ribbon bridge ferry from the 502nd Engineer Company of the 1st Armored Division can be seen transporting HMMWVs over the Mosel river in western Germany. On the ferry two M998 cargo and troop carriers with the two-man soft top and high canvas tilt and four M1025 armament carriers with basic armor are visible. At this distance it is impossible to say if some of the vehicles belong to the M998A1 series.



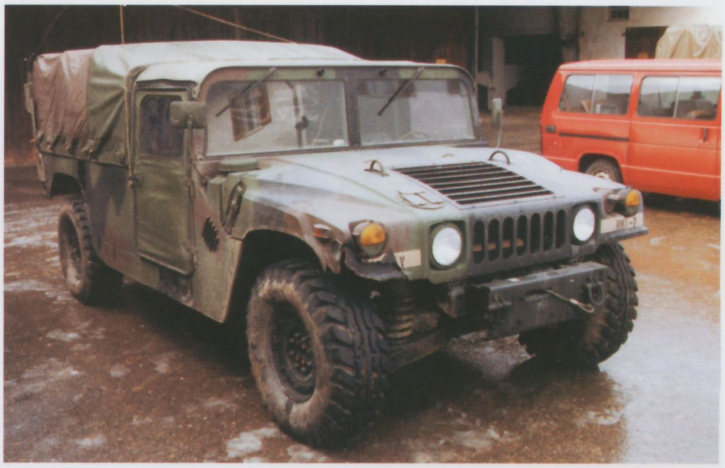
This M998 cargo vehicle with four doors and soft top enclosure was upgraded to the A1 standard and belongs to the 4th Battalion, 27th Field Artillery Regiment of the 1st Armored Division. It was seen during exercise "Rolling Steel 99". The vehicle belongs to the Battalion Headquarters and Service Battery, the main weapons system of the battalion is MLRS. Note that blue warning lights are mounted on the brush guard and an orange light is secured to a mast attached to the chassis of the vehicle.



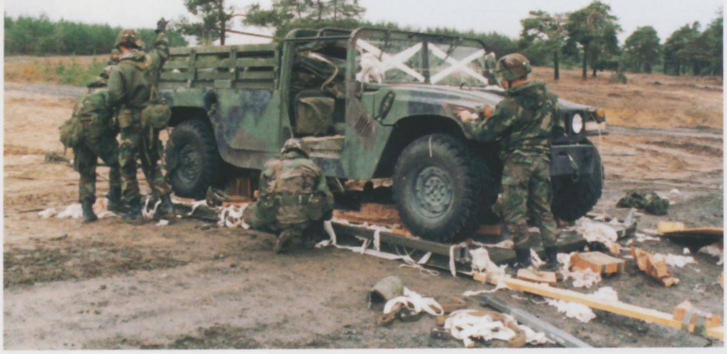
Seen during exercise "Rolling Steel 99" this M998 cargo and troop carrier with the soft top enclosure, four seats and four doors allows a chance to spot the modifications made to bring it to the A1 series standard. The new hood and mirrors are still in olive green while the rest of the body is painted in the three-color NATO camouflage pattern of brown, black and green. The vehicle belongs to A Battery, 2nd Battalion, 3rd Field Artillery Regiment of the 1st Armored Division and is leading a convoy of M109A6 Paladins through German farmland.



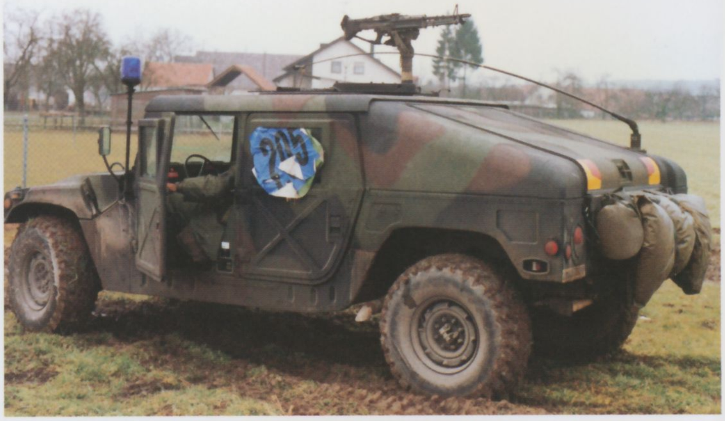
A standard M998A1 cargo vehicle with four doors and soft top enclosure is seen in Kosovo in March of 2000. The vehicle belongs to the 1st Battalion, 178th Infantry Regiment of the famous 101st Airborne Division (Air Assault). The regiment received the nickname "Rakkasans" during World War II by the Japanese. Loosely translated it means "falling umbrella". On the brush guard of the vehicle the red "Myojin Torii" symbol can be seen. The "Rakkasans" adopted this as an icon during the time when the unit was serving as an occupation force in Japan. It symbolizes the gateway to honor.



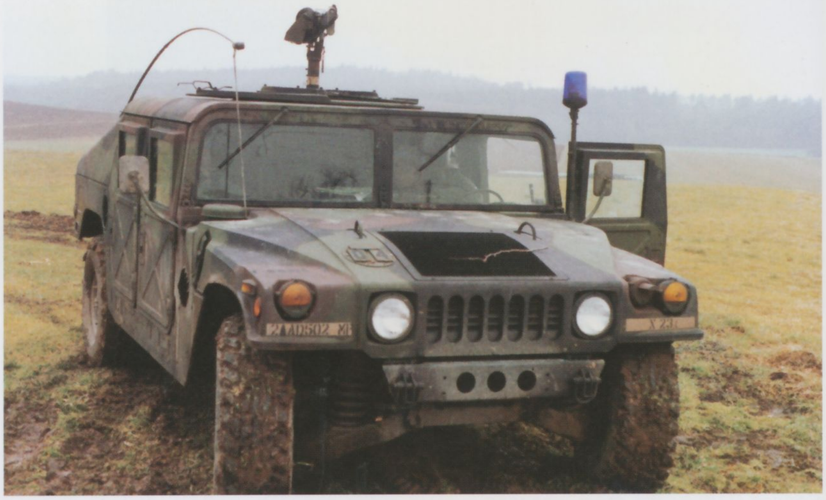
Belonging to the 11th Cavalry Regiment, this vehicle is an M1038 cargo and troop carrier with winch and two door cab soft top enclosure and tilt over the cargo bay. On the damaged right wing of the vehicle the aluminum-based fiberglass construction of the hood can be identified. (Michael Jerchel)



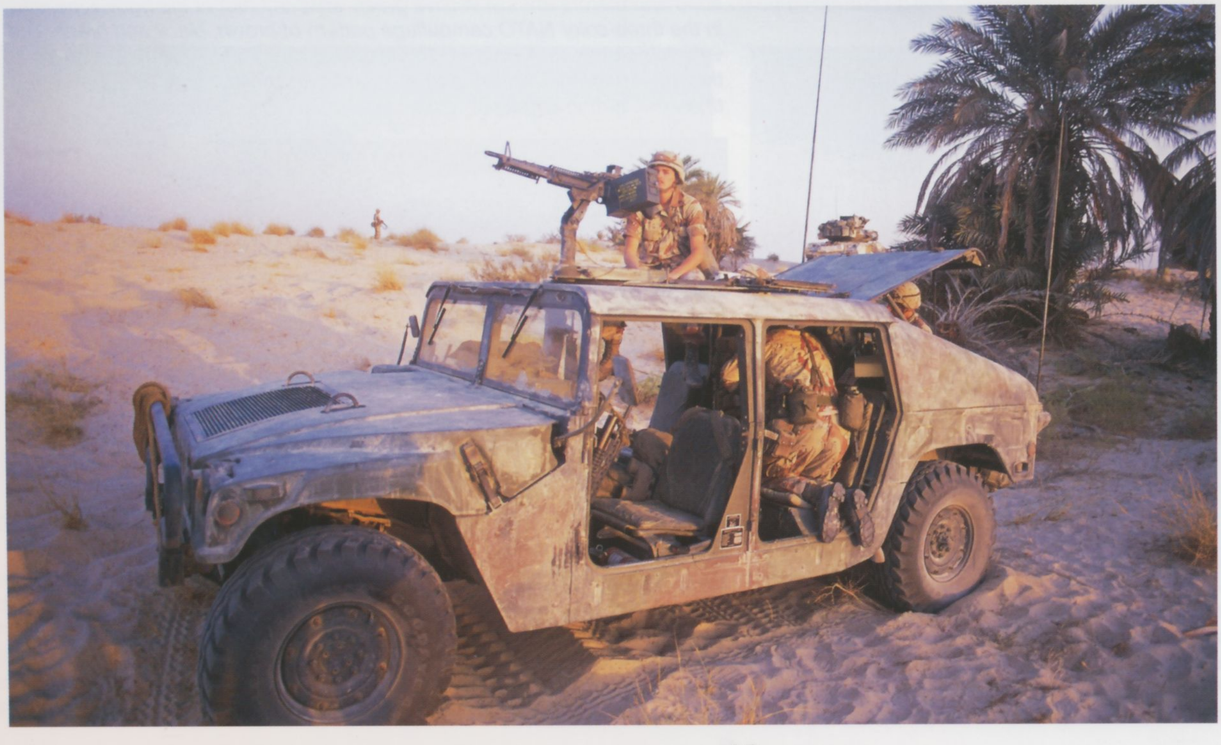
After a Heavy Drop, paratroopers from the 3/325 ABCT prepare their M1038 cargo and troop carrier with winch to move out of the drop zone. All HMMWV models except the M997A2 can be deployed by conventional air drop, like in the picture, or by the Low Altitude Extraction System. When a vehicle is dropped by parachute it is secured by chains on a heavy stress platform and all glass parts are reinforced with tape to protect them from shattering upon impact. (Walter Böhm)



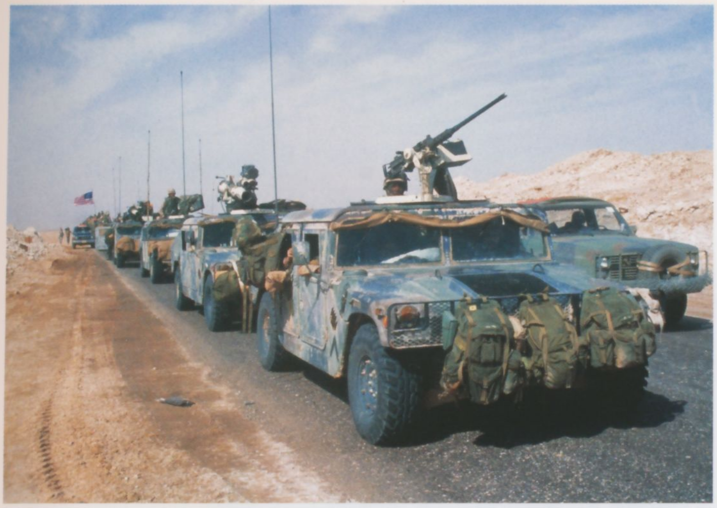
This Military Police vehicle is an M1025 armament carrier with basic armor. Seen during the 1990 REFORGER exercise "Centurion Shield", it is armed with a 7.62mm M60 machine gun mounted on its weapons ring. It belongs to the 502nd Military Police Company of the 2nd Armored Division. Other weapon systems regularly seen on this HMMWV and its sibling, the M1026 armament carrier with basic armor and winch, are the 40mm Mk.19 automatic grenade launcher and the .50 cal M2HB machine gun.



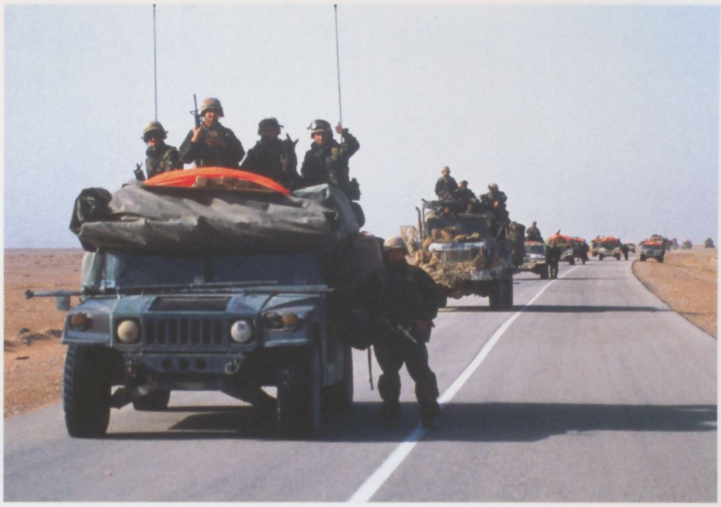
The main difference between the basic M998 cargo and troop carrier and the M1025 armament carrier with basic armor is that the latter, like all armament carriers, features a hard top which stretches from the windshield of the vehicle to its rear. The vehicle is also fitted with solid doors that add to its rigidity and can easily be recognized by an X shaped pattern. Their radiators are fitted with different grills than the basic variant's baffles, which are made of circular steel bars. The vehicle in the picture belongs to the 502nd Military Police Company of the 2nd Armored Division.



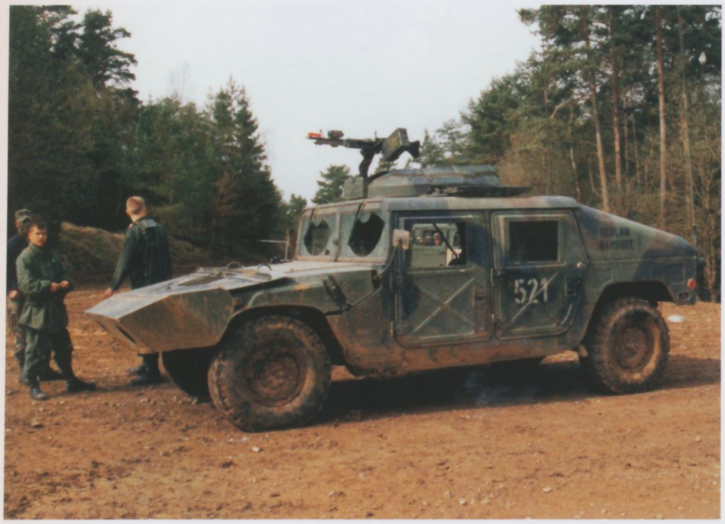
Belonging to the 82nd Airborne Division, this M1025 armament carrier with basic armor is equipped with a 7.62mm M60E3 machine gun and was seen in September of 1990 in the Saudi Arabian desert close to the border of Iraqi-occupied Kuwait. The paratroopers together with Marines were the first US forces to be deployed as part of those coalition forces. They had been deployed only a few weeks earlier in mid-August. Note that the doors of the vehicle were removed to make life inside the HMMWV more comfortable in the desert heat. (Yves Debay)



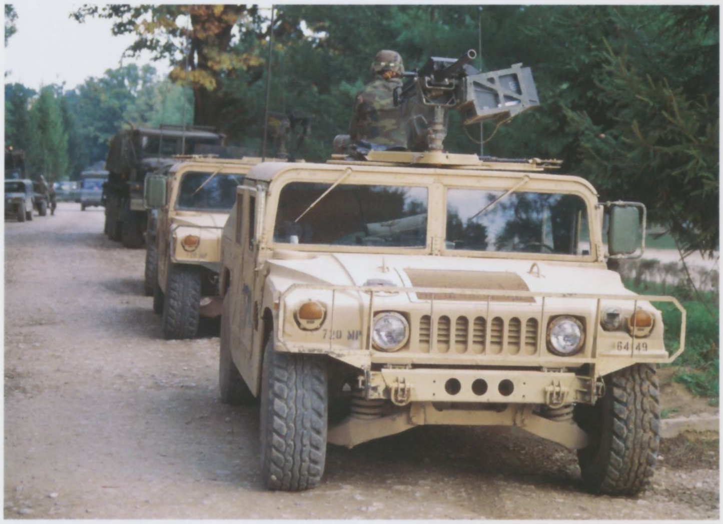
Here a column of HMMWVs from the 82nd Airborne Division can be seen pushing forward into Iraq near Nasiriyah in February 1991. The column is led by an M1025 armament carrier with basic armor and is followed by an M966 TOW missile carrier with basic armor. Note the crews' gear stored outside the vehicle on the brush guard and every other suitable place. (Yves Debay)



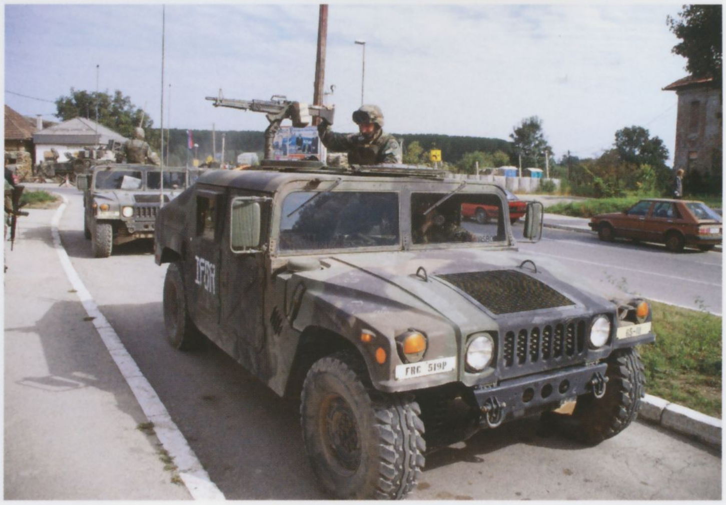
By February 25, 1991 Coalition Forces had liberated Kuwait. More than 200,000 Iraqi troops surrendered and up to 100,000 were killed. At the same time British, French and US forces had pushed deeply into Iraqi territory as far as towns like Samawa, Salman and Basra. Here a column of vehicles from the 82nd Airborne Division is advancing along the Al Salaman road deep in Iraqi territory. (Yves Debay)



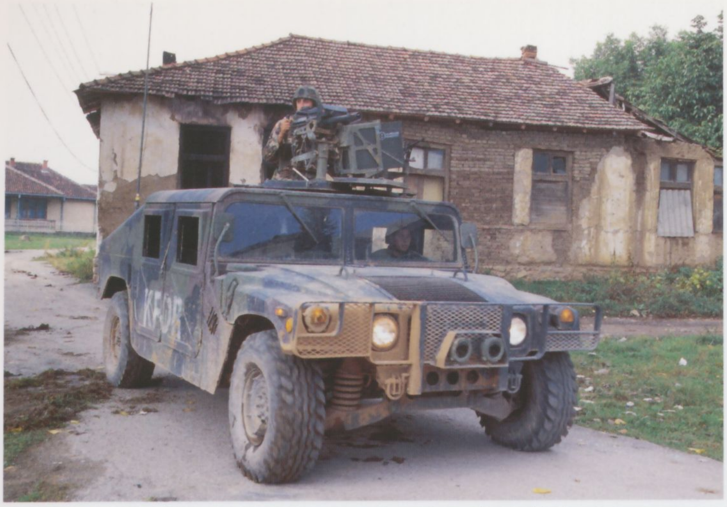
Based on an M1025 armament carrier with basic armor, this picture shows a VISMOD from the OPFOR of the Combat Maneuver Training Center on the Hohenfels training area in southern Germany. VISMODs are HMMWVs that have been reconfigured to look like BRDM-2s in order to more realistically simulate enemy forces. This vehicle was seen during an exercise in the Hohenfels in autumn of 1992. Clearly visible is the new nose added to the vehicle made out of fiberglass, plywood and metal. VISMODs are made at the National Training Center in Fort Irwin, California. They are based on the M998 cargo and troop carrier that in addition to a fitted nose section also include a mock up frame fitted on the bonnet and even a model of the BRDM-2 turret placed on the roof. (Michael Jerchel)



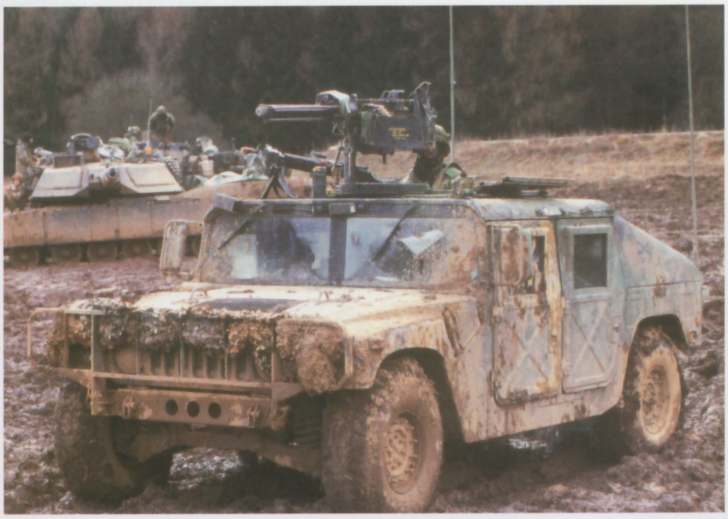
Belonging to the 64th MP Company, 720th Military Police Battalion, this upgraded M1025 armament carrier with basic armor was seen at the US IFOR forces main base called "Eagle Base" at Tuzla in summer of 1996. Like all vehicles of the 2nd Armored Division based in Fort Hood, Texas it is painted in desert camouflage. During their IFOR deployment the soldiers of the unit supported the 1st Squadron of 4th Cavalry Regiment. The vehicle is armed with a 40mm Mk.19 automatic grenade launcher.



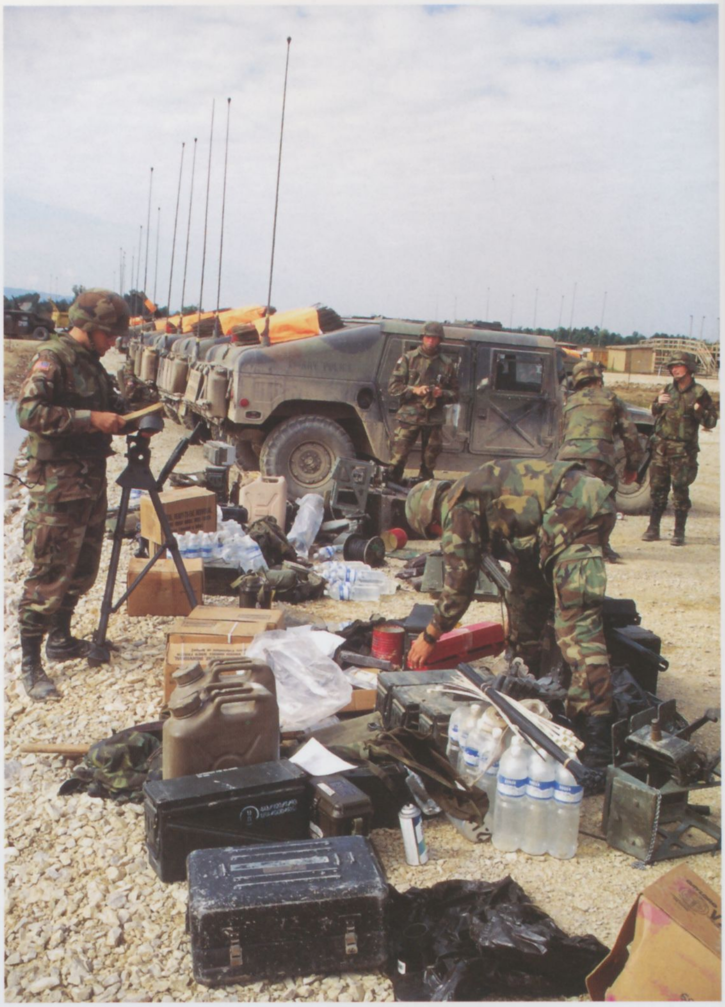
Belonging to the 519th Military Police Battalion this M1025 armament carrier with basic armor is fitted with a 7.62mm M60E3 machine gun. It was seen in the summer of 1996 when US troops from IFOR's MND(N) showed a massive presence in the Brcko corridor to deter Serbs from attacking Muslim and Croats which were returning to their former homes.



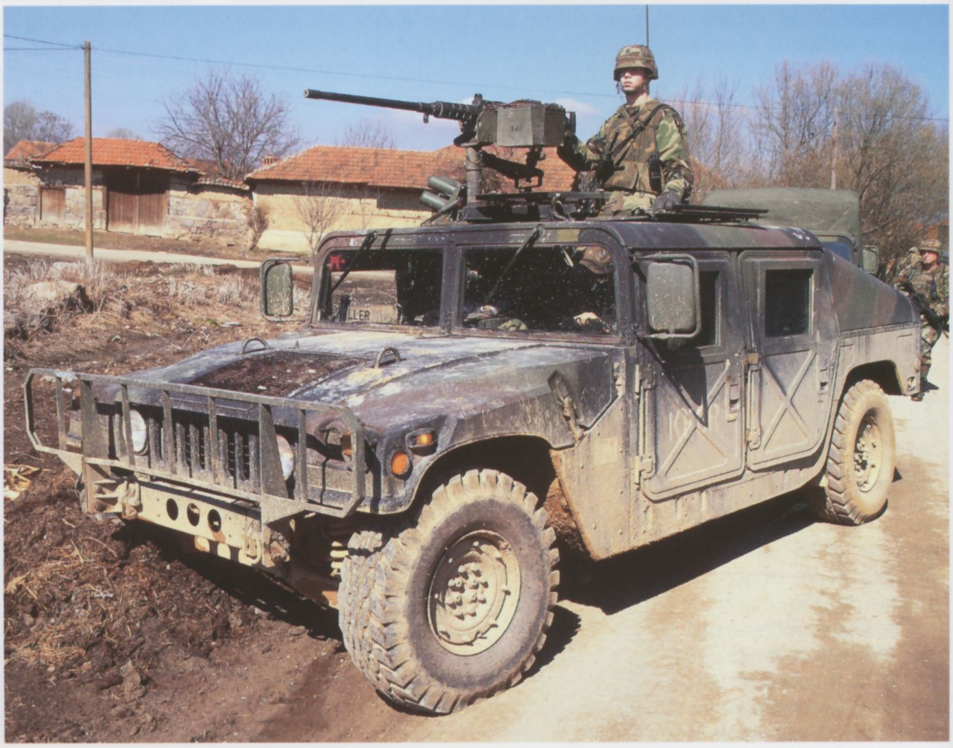
In October 1999 this M1025 armament carrier with basic armor was seen in use with A Company, 3rd Battalion, 504th Parachute Infantry Regiment from the famous 82nd Airborne Division, which then formed part of KFOR. In front of the brush guard of the vehicle police-type blue warning lights are mounted and on the roof a 40mm Mk.19 automatic grenade launcher is visible.



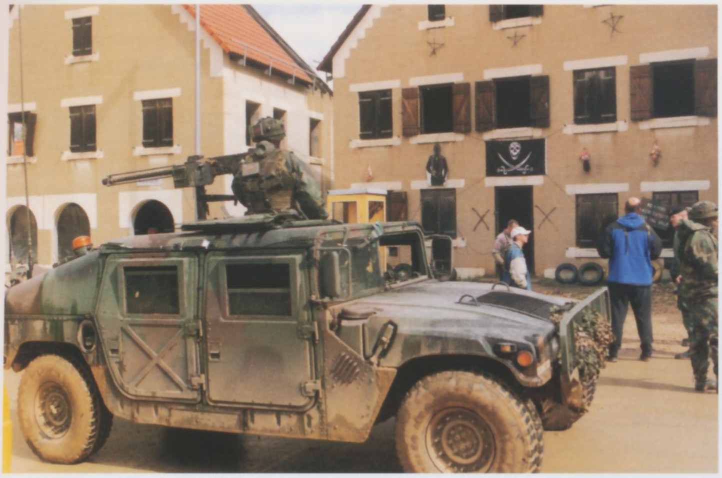
Seen in its element, this M1025 armament carrier with basic armor is from the Scout Platoon, 1st Battalion, 35th Armored Regiment and was pictured at the CMTC in Hohenfels in February 2000. The General Motors 6.2 liter V-8 Turbo diesel engine provides 150 hp, is coupled to a General Motors THM 400 three-speed automatic transmission and is connected to a two speed full time four wheel drive transfer box. This allows for high speed and excellent cross country ability, even in rough and muddy conditions. This is further enhanced by an independent double A frame with open end coil springs, hydraulic shock absorbers and a ground clearance of 40cm. (Walter Böhm)



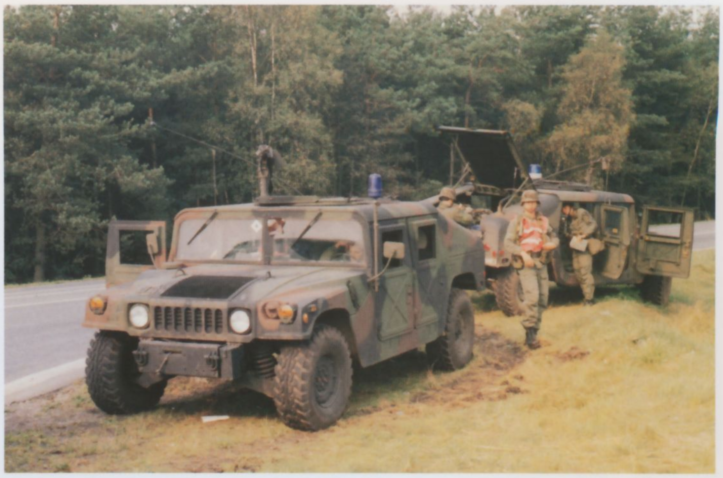
Prior to handing over vehicles to the next unit, US soldiers from a Military Police unit can be seen cleaning and checking equipment shortly before they will leave Bosnia after six months of IFOR operation. Note the mix of water bottles, weapon parts, plastic hand cuffs, MREs, clothing and so on which are usually stored in the rear of the M1025 armament carriers with basic armor. However the storage room inside is never large enough for soldiers as is evident from the fact that equipment is usually stored on the roof and any other suitable location.



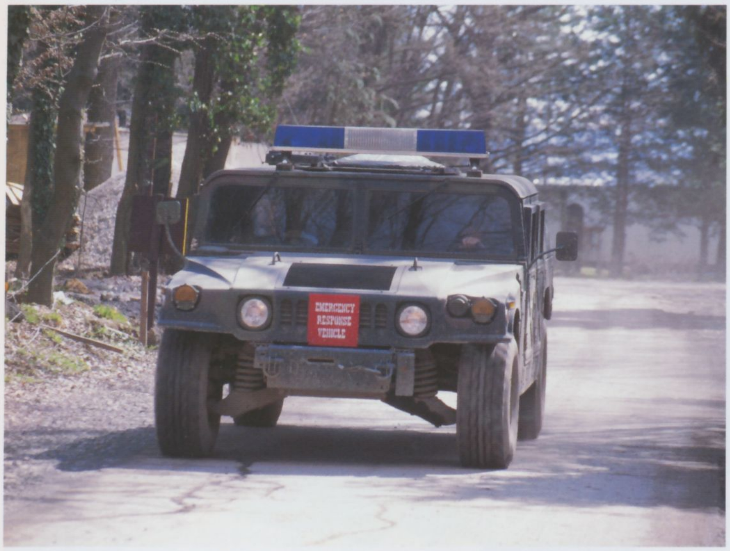
Also seen at the Balkans was this M1025 armament carrier with basic armor. It was fitted with a .50 cal M2HB machine gun and is at a mobile VCP of the 5th Platoon, nicknamed "War Pigs", of D Company, 1st Battalion, 178th Infantry Regiment. Although this picture was taken in Kosovo in 2000, the mission was still the same, except this time the Serbs were now being threatened by the Albanians. In order to add protection from land mines and hand grenades, a thick layer of sandbags usually covered the floors of the vehicles with basic armor. Also, the doors could only be opened from the inside to protect against someone trying to throw a grenade or fire their weapon inside.



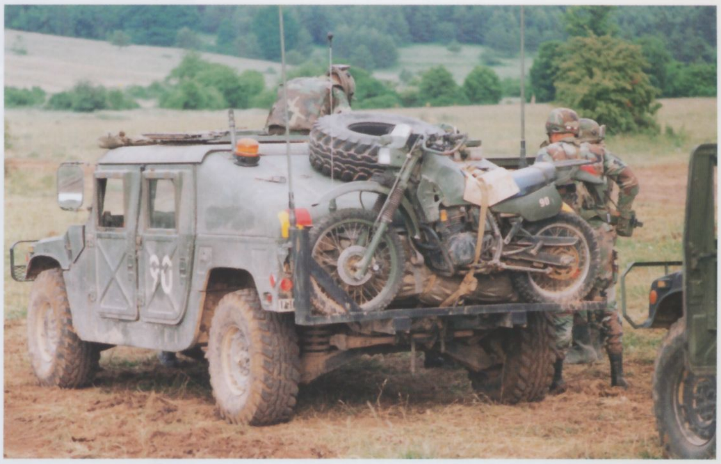
Belonging to the M998 HMMWV series, this vehicle which has been modified to the A1 series standard is either an M1025 armament carrier with basic armor or an M1043 armament carrier with supplemental armor. The front doors have been outfitted with supplemental armor and the rear door features the distinctive X-shaped pattern of vehicles with basic armor. In September 2000 it was seen at the CMTC Hohenfels in Germany and belongs to the 1/508 ABCT. Similar vehicles were also seen with other units such as the 1st Cavalry Regiment. (Walter Böhm)



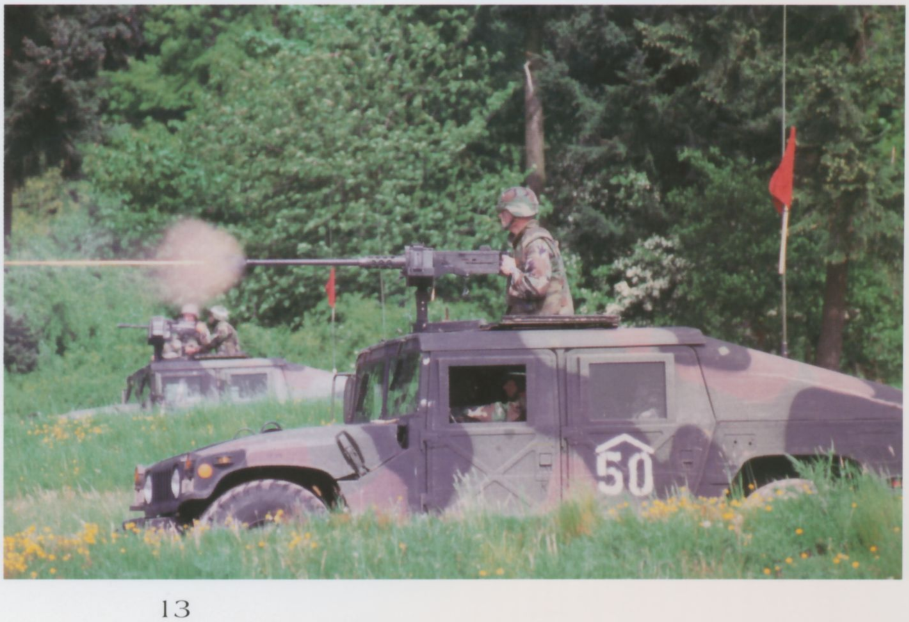
The M1026 armament carrier with basic armor and winch can be seen here in use with a Military Police unit of the 1st Cavalry Division during the 1987 REFORGER exercise "Certain Strike" in northern Germany. Note the sliding mechanism of the windows that is visible on the second vehicle and the open cargo compartment hatch. On the first vehicle a 7.62mm M60 machine gun is mounted on the weapons ring. (Michael Jerchel)



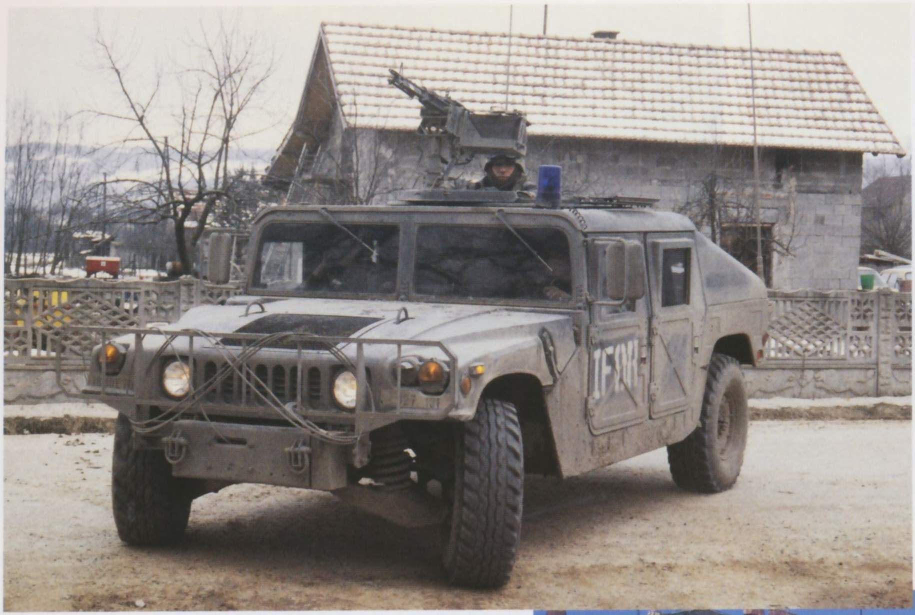
In service with SFOR this M1026 armament carrier with basic armor and winch belongs to the emergency response team from the main base of Task Force Eagle, the second name of the US led MND(N). While travelling down one of the countless tracks of the former Yugoslav Air Force base in Tuzla, the "whoopy lights" on the vehicle are clearly visible.



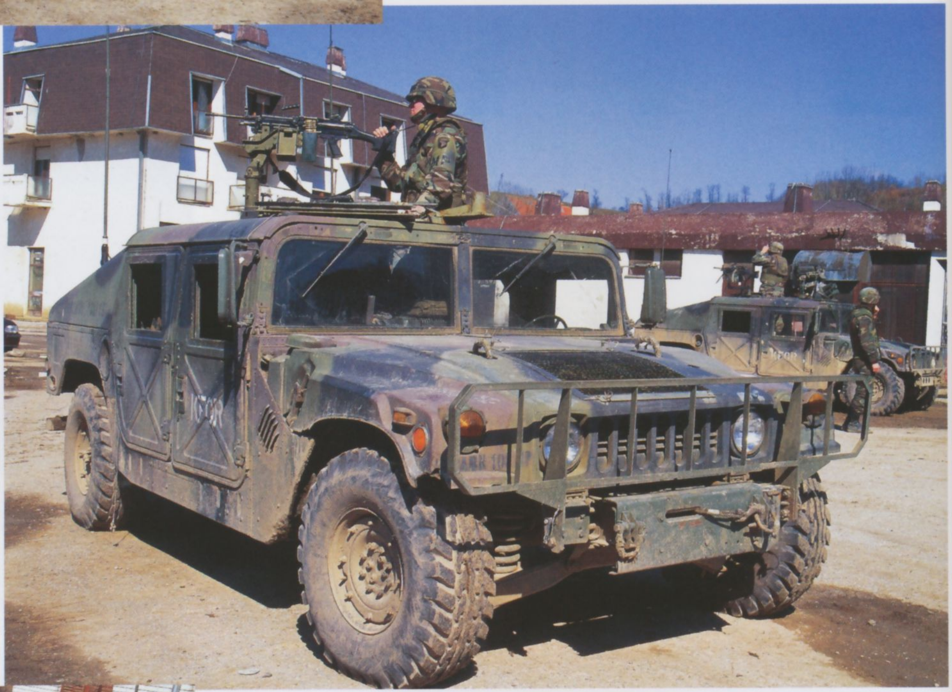
One of the countless modifications made by troops on the HMMWV can be seen on this M1026 armament carrier. It has the basic armor and winch and belongs to the "Light Horse" platoon, HQ Troop, 1st Squadron, 1st Cavalry Regiment. Seen on exercise "Iron Star 94" a platform is mounted on the rear of this HMMWV containing a Kawasaki KL-250D8 cross country motorbike, which was used for light reconnaissance missions. At least nine vehicles from this unit had this modification and were seen during the exercise. Even though no weapons are seen in this picture, the weapons mounted on the top usually included .50 cal M2HB machine guns and 40mm Mk.19 automatic grenade launchers. (Walter Böhm)



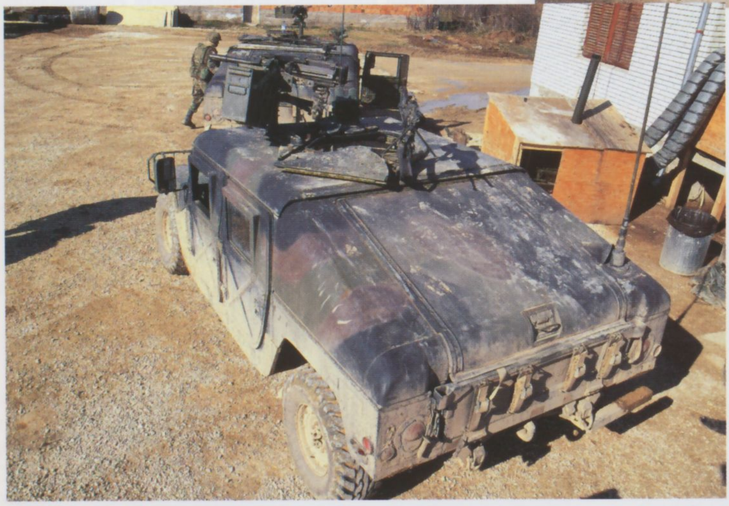
These two M1026 armament carriers with basic armor and winch are from the Scout Platoon of the 2nd Battalion, 6th Infantry Regiment and were seen during the unit's annual gunnery at the Grafenwöhr training area in southern Germany. The vehicle in the foreground is fitted with a 12.7mm M2HB machine gun that is firing tracer ammunition, while the vehicle in the rear is fitted with a 40mm Mk.19 automatic grenade launcher. (Walter Böhm)



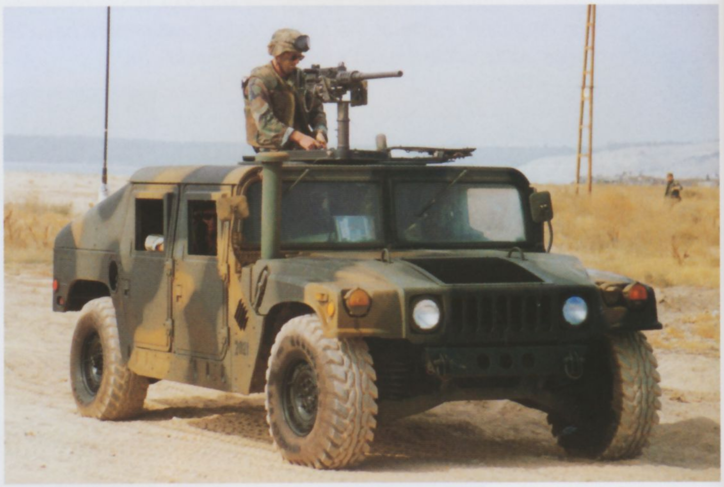
Fitted with a 7.62mm M60E3 machine gun this M1026 armament carrier with basic armor and winch belongs to the 709th Military Police Battalion of the 18th Military Police Brigade. This vehicle was seen in Bosnia where the unit was deployed as part of IFOR's US lead MND(N) in March 1996. The HMMWV armament carriers form the workhorse of the US MP units during operations and exercises. Usually pairs of MP vehicles can be seen at every crossroad with soldiers guarding the traffic, monitoring movements or just conducting VCPs for military and civilian vehicles.



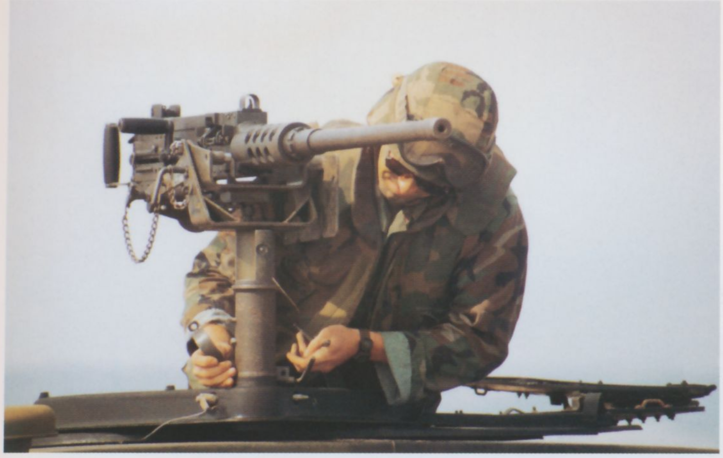
Belonging to the 101st Airborne Division (Air Assault) MP Company this M1026 armament carrier with basic armor and winch is another example of modifications that can be made to the standard A1. The mounting for the old mirror is still visible. It was pictured on patrol in the village of Ljubiste which is situated in the south of KFOR's MNB(E) AOR.



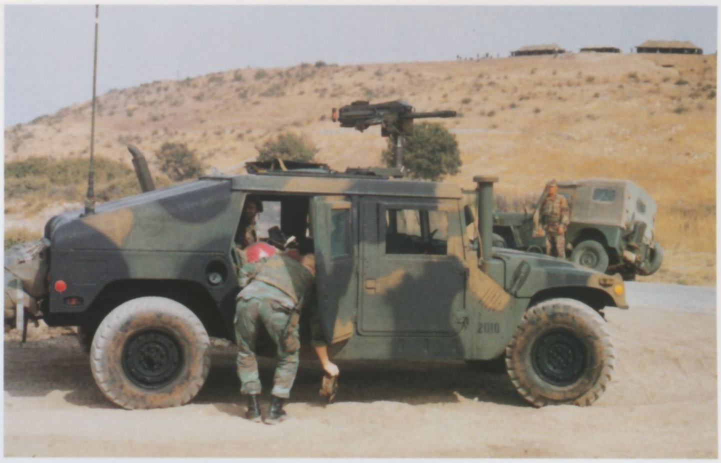
Taken in Kosovo in March of 2000, this picture shows a top view of an M1026 armament carrier with basic armor and winch. It belongs to the 1st Battalion, 178th Infantry Regiment of the 101st Airborne Division (Air Assault). Note that the vehicle's weapons ring has two pintle mounts. On one a 40mm Mk.19 automatic grenade launcher is mounted while the second is fitted with a 5.56mm M249 Squad Automatic Weapon. In addition, four electrically operated smoke dischargers can also be attached to the weapons ring.



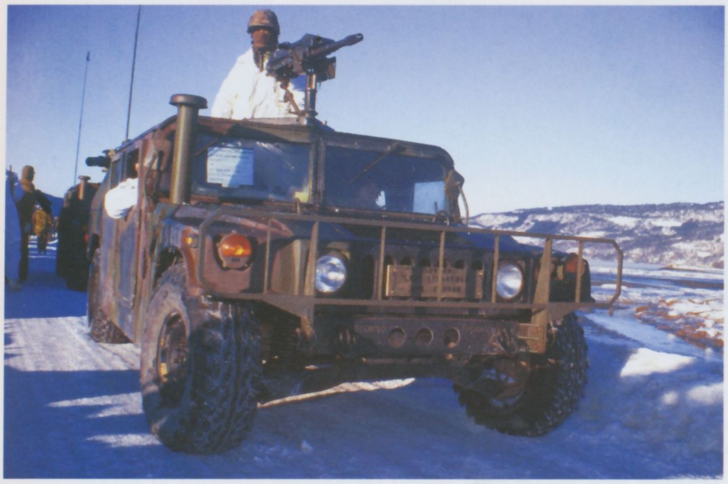
Here an M1043 armament carrier with supplemental armor from the USMC's II MEF can be seen during Exercise "Determination Display 92" in Turkey. On the weapons ring of the vehicle a .50 cal M2HB machine gun is mounted. The windows are made out of bullet resistant glass and have been rolled down. The windshield glass of the armored versions is also bullet resistant. Note the extended air intake pipe and exhaust which are standard features on all USMC HMMWVs. This allows fording up to a depth of 1.52m.



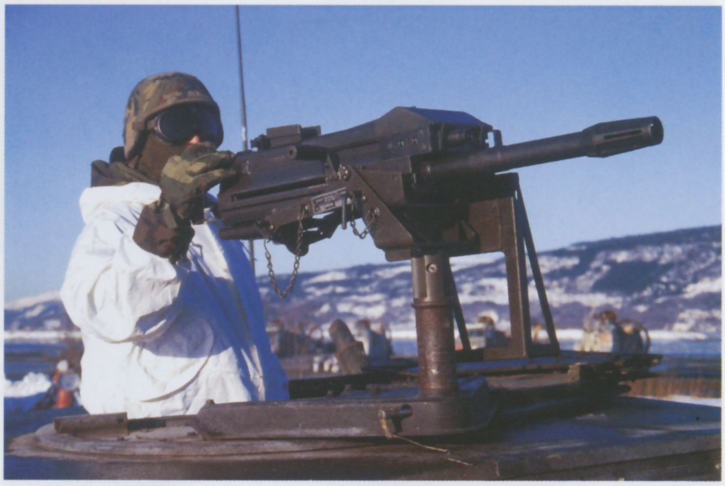
The M1025, M1026, M1043 and M1044 HMMWV armament carriers all have the thirty-two inch weapons ring mounted on their roofs. These rings are fitted with pintle mounts and quick release cradles. The pictured weapons ring belongs to an M1043 with supplemental armor from the USMC and is fitted with a .50 cal M2HB machine gun.



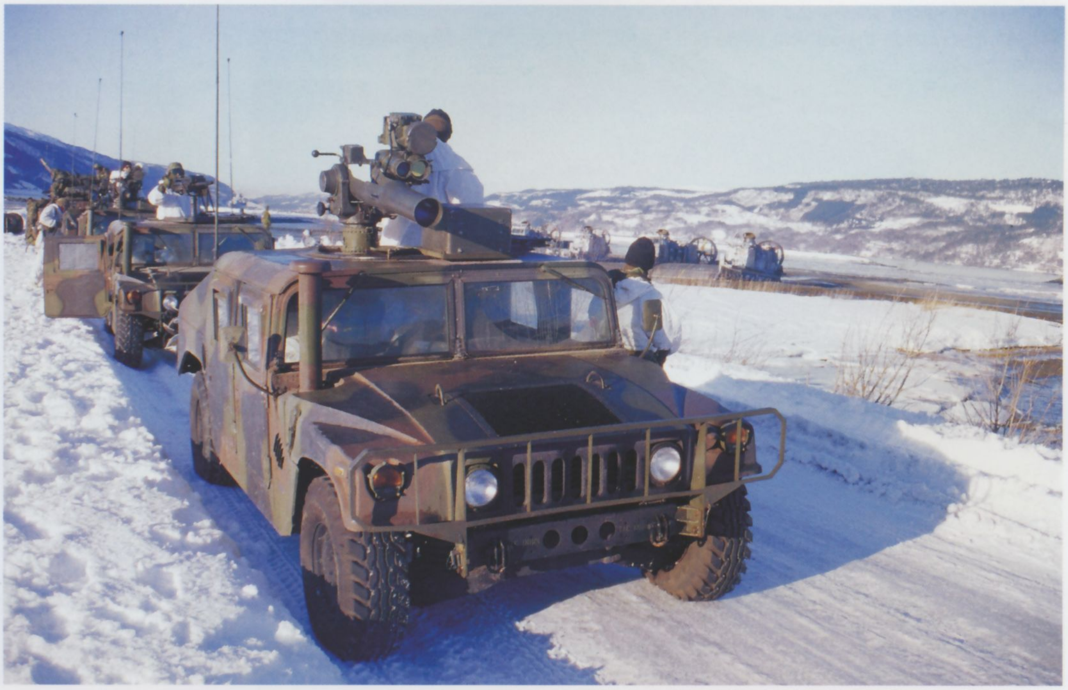
This M1043 armament carrier with supplemental armor from the USMCs II MEF is armed with a 40mm Mk.19 automatic grenade launcher. The Mk.19 has an effective range of 1,500m and can fire belted 40mm ammunition such as the M430 High Explosive Dual Purpose round with a rate of fire between 325 to 385 rounds per minute. In the rear of the picture a Jeep can be seen, the predecessor of the HMMWV. The Jeep is still in service with countless nations, and in this case belongs to the Turkish Army.



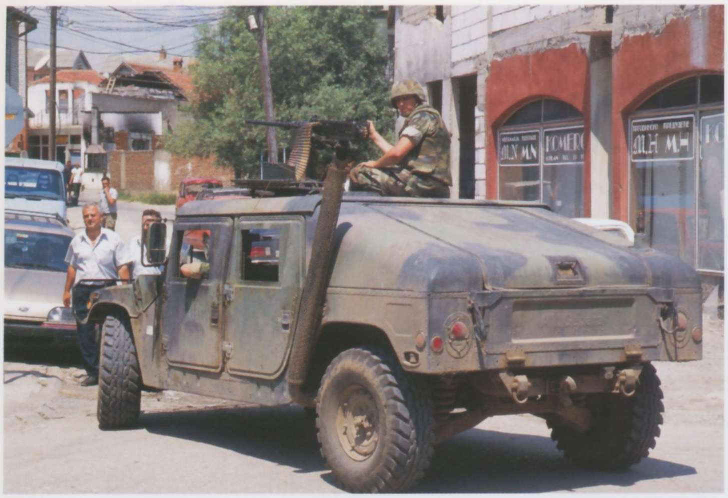
This M1043 armament carrier with supplemental armor is outfitted with the 40mm Mk.19 automatic grenade launcher and belongs to the 2nd Battalion, 10th Marines and was seen during exercise "Strong Resolve 95" in Norway. Note the brush guard, a feature missing on earlier HMMWVs of the same type that were in use with the II MEF.



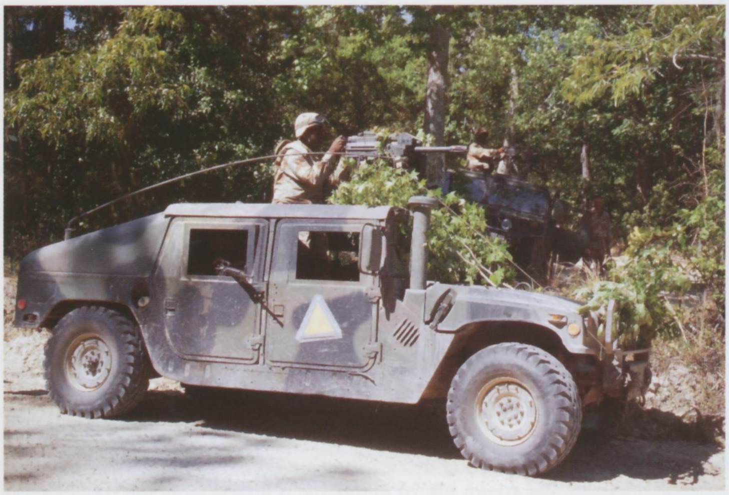
A close-up of a 40mm Mk.19 automatic grenade launcher mounted on an M1043 from the 2nd Battalion, 10th Marines. The weapon is pintle-mounted on a thirty-two inch weapons ring.



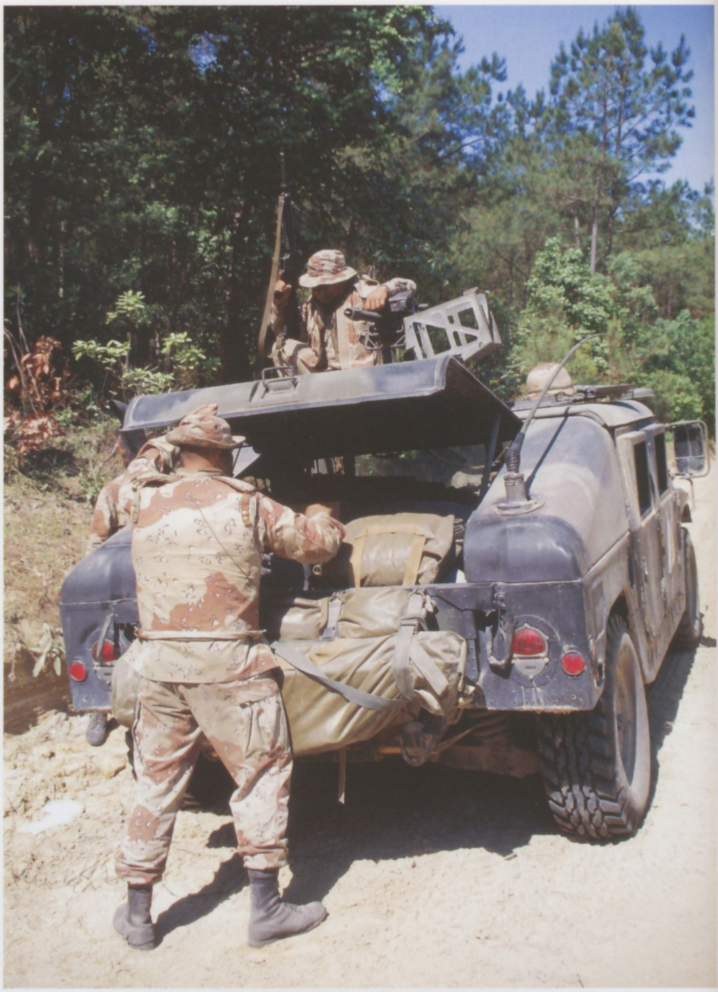
After they "hit the beach" HMMWVs from the 2nd Battalion, 10th Marines of the II MEF can be seen lined up in a fjord in central Norway. In line is an M1043 outfitted with a 40mm Mk.19 automatic grenade launcher and two M1045 TOW missile carriers with supplemental armor. Note the Marine HMMWV's extended air intake and the LCACs of the ACU 2 in the rear.



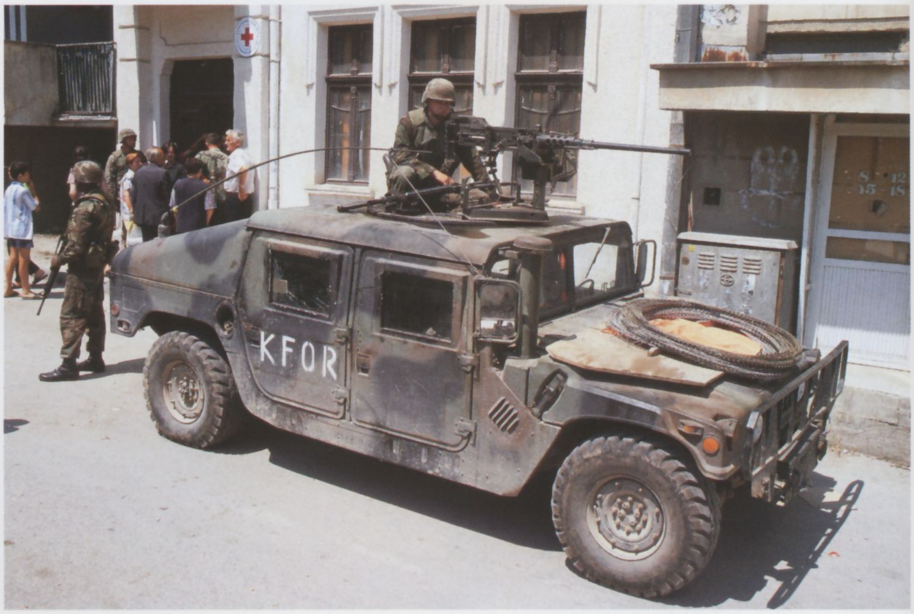
This rear view shot is from a 3rd Battalion, 8th Marines M1043 armament carrier with supplemental armor and was seen in Gnjilane in July of 1999. Well visible is the extended exhaust pipe and doors with supplemental armor, which is typical for a USMC HMMWV. A "Leatherneck" is manning the weapons ring that is mounted with a 12.7mm M2HB machine gun.



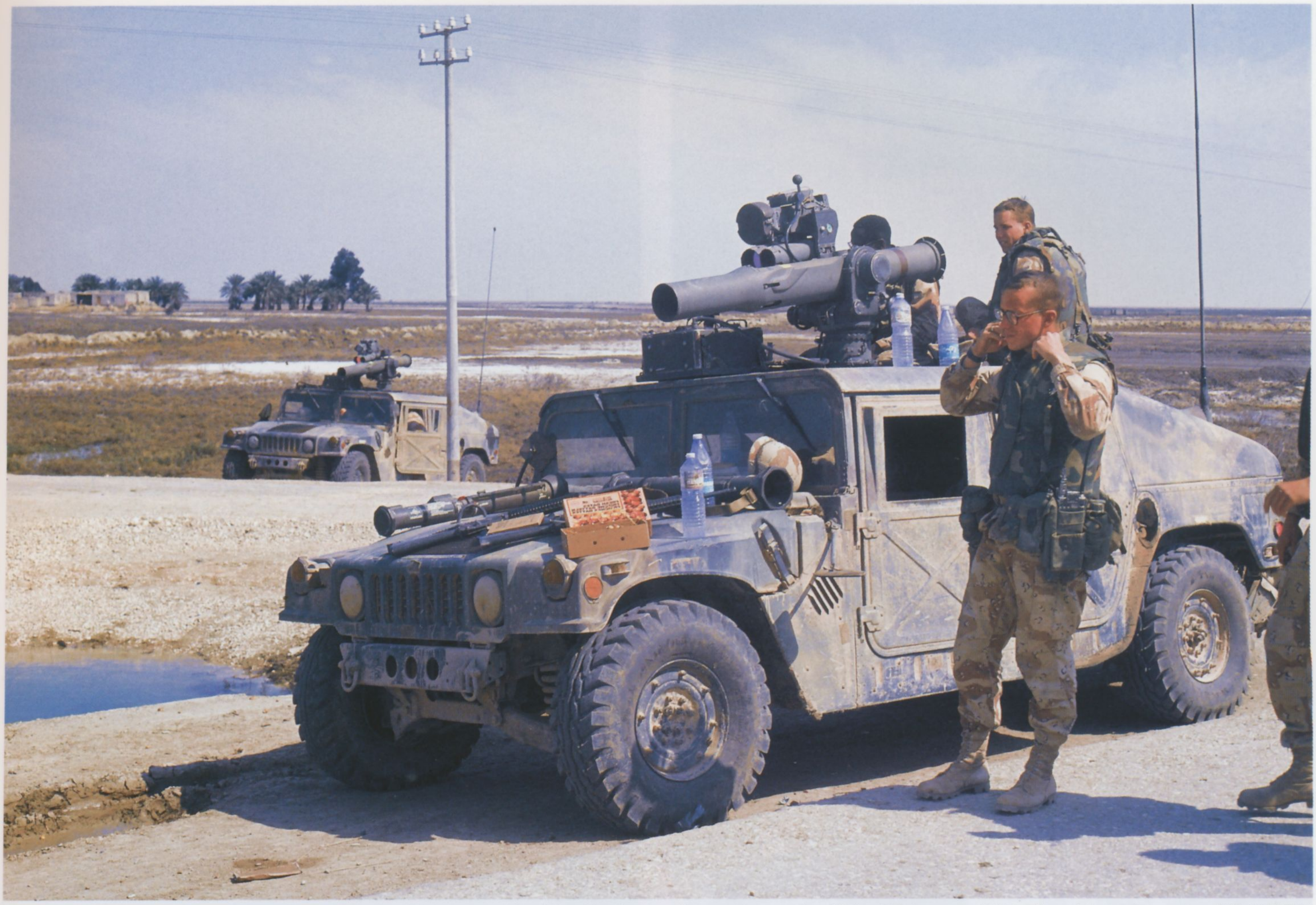
M1044 armament carriers with supplemental armor, winches and armed with 40mm Mk.19 automatic grenade launchers was deployed by the II MEF at the Camp Lejeune training area in order to stop the advance of dismounted Marines from the 2nd Battalion, 8th Marines. The windows can be lowered which allows the crew to fire small arms such as the visible M16A2 from inside the vehicle while still having the advantage of armored protection.



Belonging to the II MEF this rear view shows an M1044 armament carrier with supplemental armor and winch. It is armed with a 40mm Mk.19 automatic grenade launcher. This vehicle was seen during exercise "Purple Star 96" being used by OPFOR units, which can also be recognized because their troops wear desert camouflage uniforms in wooded areas. Note the large open cargo compartment hatch on the rear side of the vehicle.

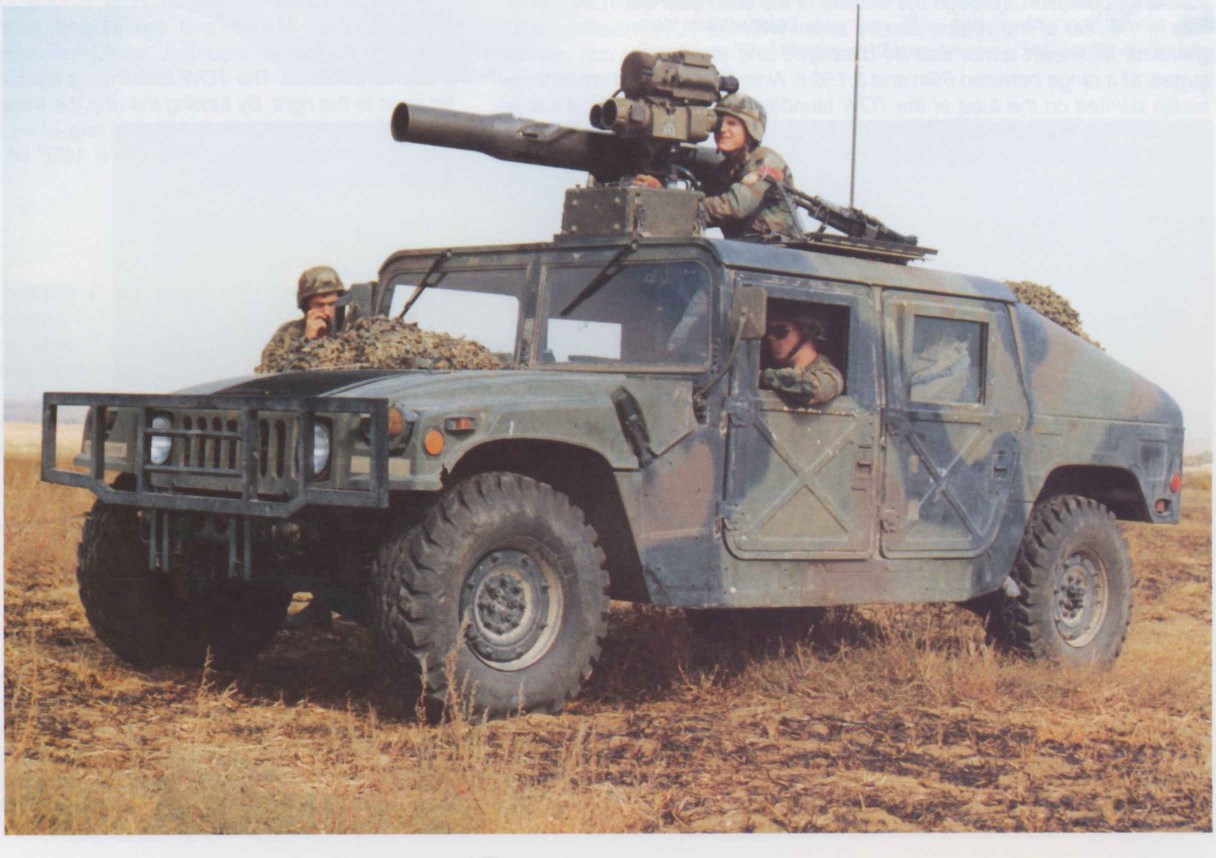


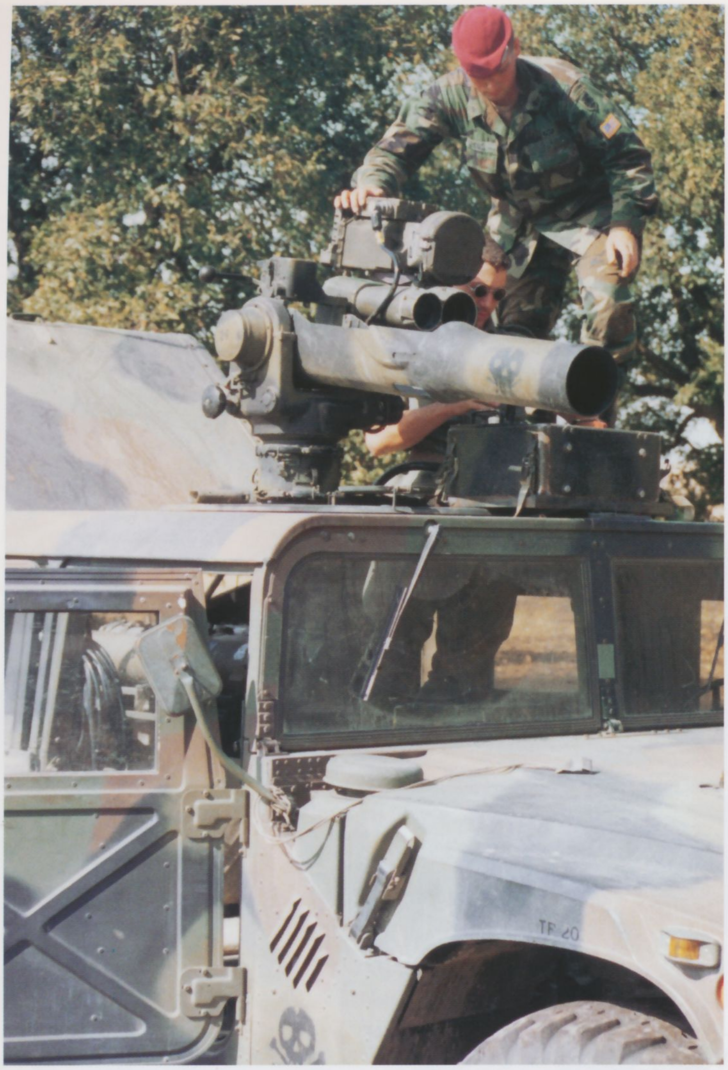
Belonging to the 3rd Battalion, 8th Marines, this M1044 armament carrier with supplemental armor and winch is armed with a .50 cal M2HB machine gun and was seen in early July 1999 in Gnjilane. During the Marines' deployment with KFOR, the troops showed a massive presence on the roads of the mixed ethnic city and every human aid distribution point was guarded to prevent plundering. This vehicle was seen in front of a Red Cross money distribution point. Should the troops need to quickly establish a safe perimeter, razor sharp concertina wire is carried on a wooden board mounted on the HMMWV's hood.



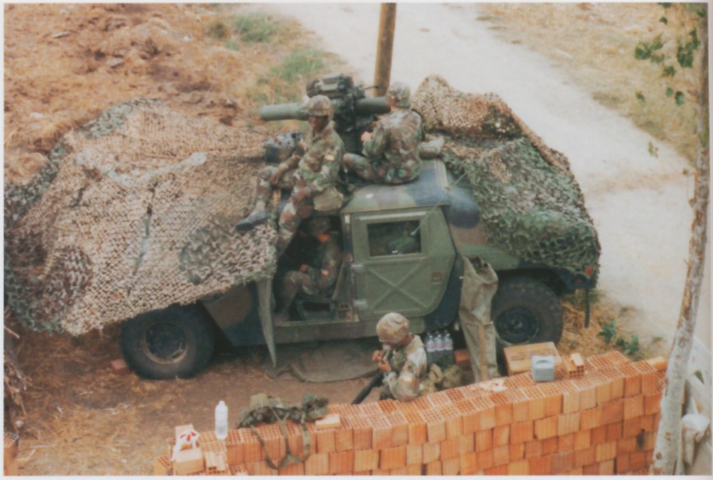
Near Samawa troops of the 82nd Airborne Division reached the Euphrates river valley on the 26th of February, 1991. The picture shows two M966 TOW missile carriers with basic armor from one of the anti tank elements of the division after the fighting had ceased. Fighting had essentially ended February 25 after the liberation of Kuwait City, even though President Bush did not declare an official cease-fire until the 27th. The ground war had only taken 100 hours. (Yves Debay)

Here an anti armor team M966 TOW missile carrier with basic armor from the 3/325 Airborne Battalion Combat Team can be seen awaiting the attack of Turkish M-48 MBTs during the AMF(L) exercise "Alley Express" in October of 1992. With its speed and cross country ability the HMMWV is an ideal platform for TOW when the weapon is used during a withdrawal or an advance.

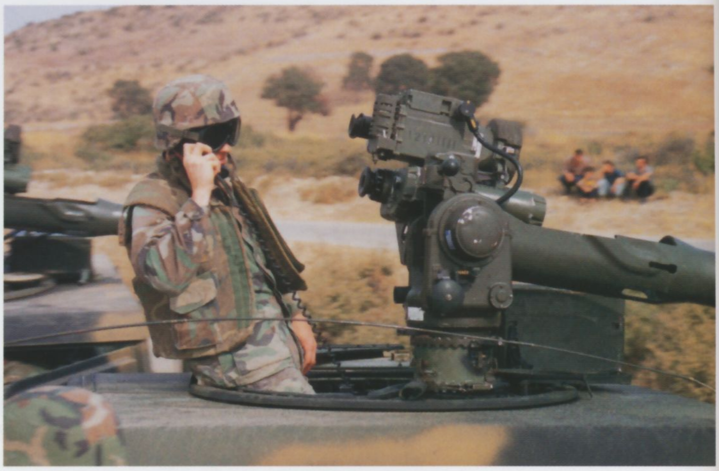




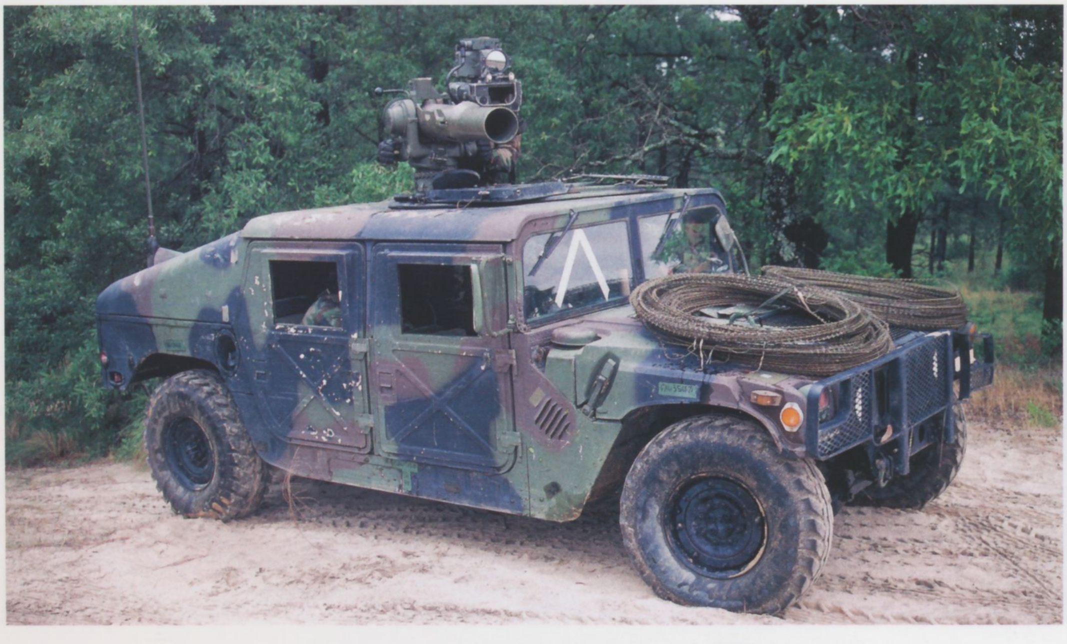
Here the crew of an M966 TOW missile carrier with basic armor of the 3/325 Airborne Battalion Combat Team can be seen preparing their TOW missile for operation. Through the window of the solid door the TOW missile rack in the rear of the vehicle can be seen. With the TOW missile's HEAT warhead, all known armor can be destroyed and the system can destroy targets at a range between 65m and 3,750m. Note the skull and crossbones badge painted on the tube of the TOW launcher and on the vehicle's side. This identifies the vehicle as belonging to the unit's 2nd Anti Tank Platoon. In total the 3/325 ABCT has twenty HMMWVs armed with TOW, ten in each of the two platoons.



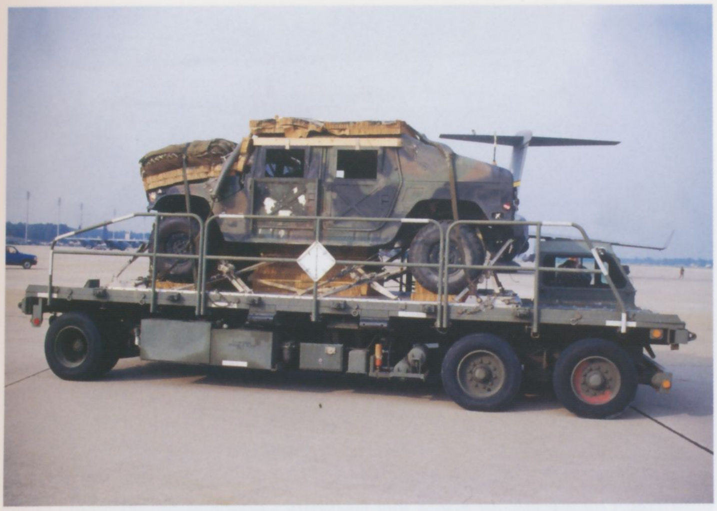
Inside all TOW missile carrier variants, six missiles can be carried in a rack to the rear of the vehicle. If tactical reasons require it, the TOW missile system can also be dismounted and deployed on a tripod. This M966 TOW missile carrier with basic armor is from the 3/325 Airborne Battalion Combat Team of the South European Task Force (SETAF). It was seen during the AMF(L) exercise "Alley Express 92" in Turkey in October of 1992.



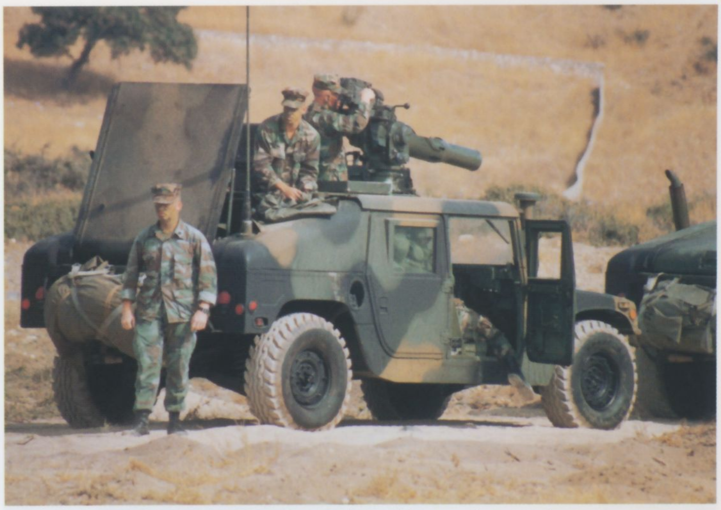
The weapons ring on all TOW missile carrier variants such as the M966, M1036, M1045 and the M1046 is thirty-six inches. When the weapons system is mounted, additional support is provided by a floor mounted pedestal. The TOW launcher is fitted on a circular mount that can be seen to the right. By turning the ring the weapon can be rotated manually 360°. Pictured here is the weapons ring of an M1045 TOW missile carrier with supplemental armor from the II MEF of the USMC during exercise "Determination Display 92".



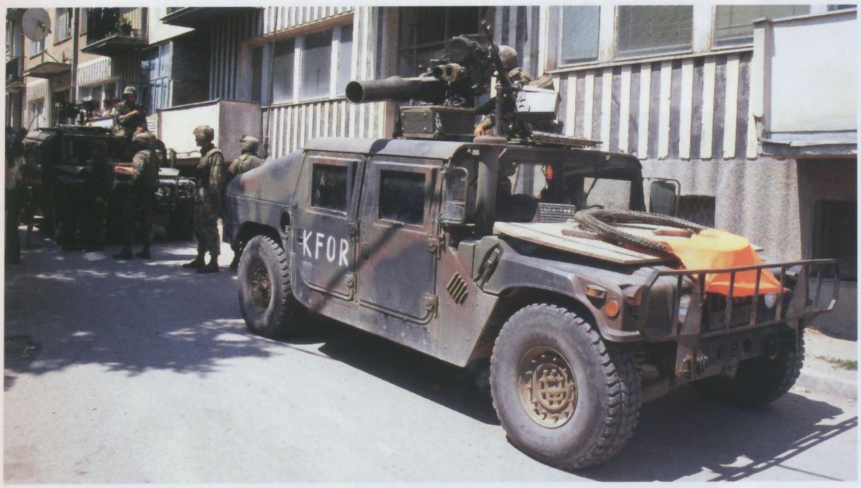
Seen on exercise "Purple Star 96" at Fort Bragg, this M966 TOW missile carrier with basic armor belongs to the 82nd Airborne Division. The vehicle was refitted to A1 standard and the mounting for the old type mirror can be seen. Note the concertina wire rolls carried on the hood. Under them a friend/foe identification panel can be seen.



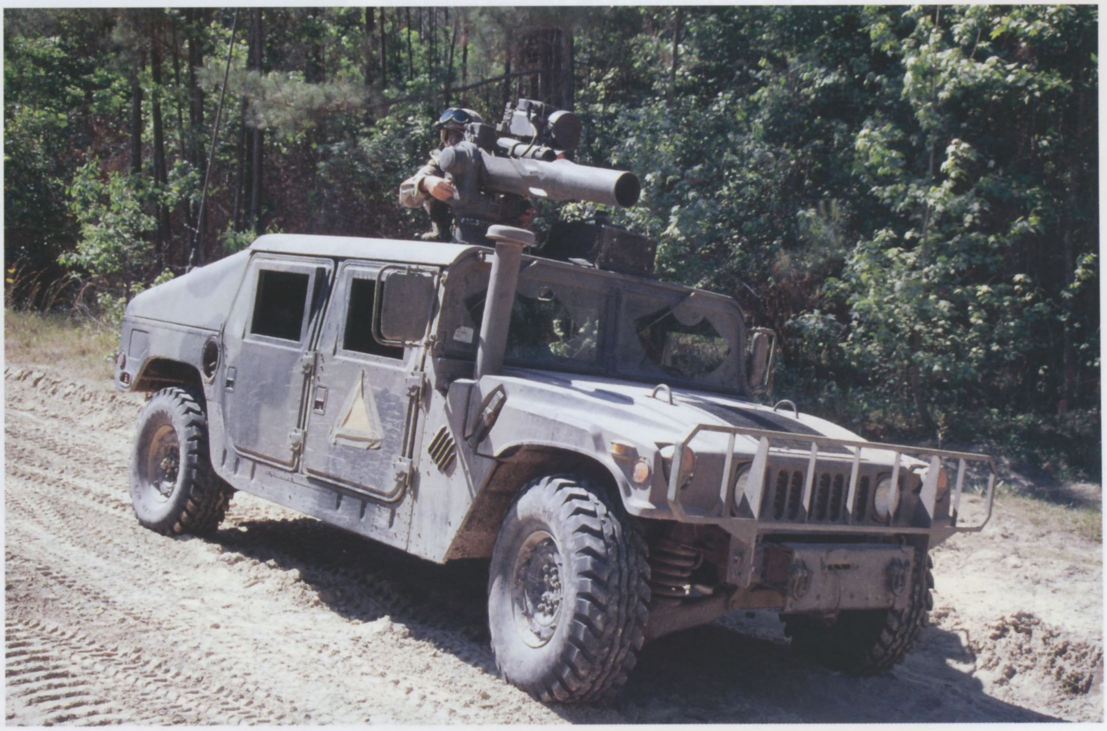
Prepared for a parachute drop this M966 TOW missile carrier with basic armor from the 82nd Airborne Division was seen on a tarmac at Ford Bragg. The vehicle is chained to a heavy stress platform and is accompanied by a pack of cargo parachutes. For protection the vehicle shock absorber panels, which are made out of cardboard, can be seen placed underneath the vehicle or on the roof. This picture was taken during exercise "Purple Star 96".



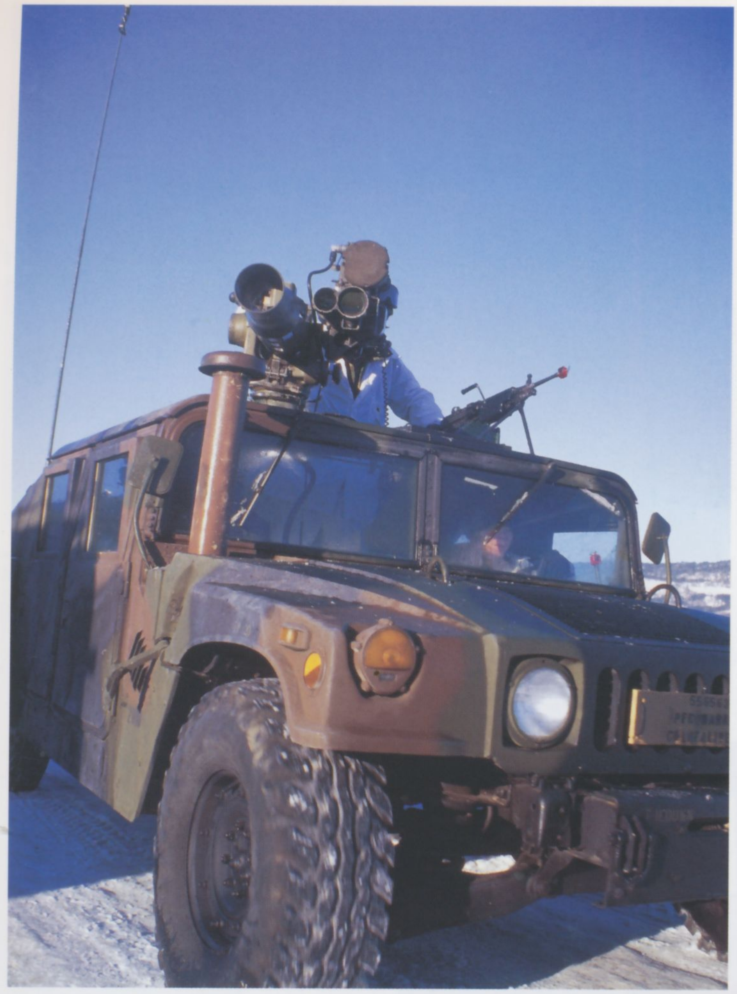
This M1045 TOW missile carrier with supplemental armor was seen during exercise "Determination Display 92" on a beach in West Turkey in October 1992. It belongs to the 2nd Marine Expeditionary Force (II MEF). The best way to distinguish vehicles with supplemental armor from vehicles with basic armor is by the absence of the distinctive X shaped pattern on the side doors. Note the large rear hatch that can be opened, lifted or pushed back like in the picture. It is believed that the bulk of the manufactured HMMWVs with supplemental armor were issued to the USMC.



In addition to a TOW missile system, this M1045 TOW missile platform with supplemental armor has a pintle mounted 7.62mm M240 machine gun fixed to its weapons ring. The practice of mounting a light weapon in addition to a heavier weapon system such as a TOW or a 40mm grenade launcher was first seen with the US Armed Forces in Kosovo and is a result of the tactical aspects of a peace support operation. Due to the rules of engagement and the crowds of civilians often present, heavy weapons are not suitable to deal with armed gunmen. This vehicle belongs to the 3rd Battalion, 8th Marines and was seen in Gnjilane in early July of 1999.

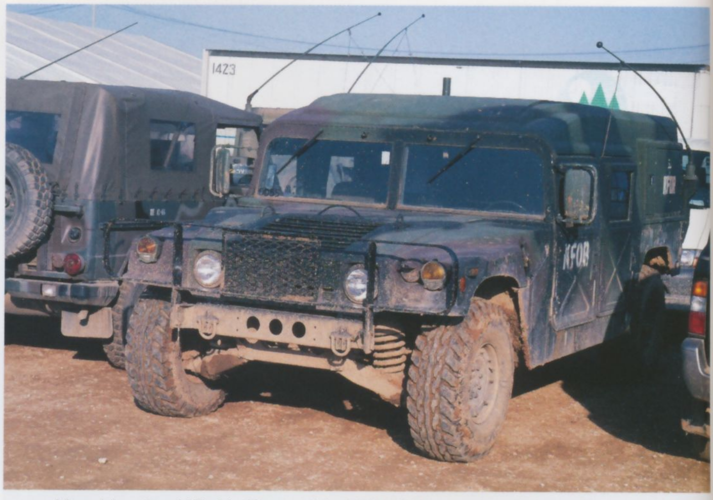


This M1046 TOW missile platform with supplemental armor and winch provides the anti tank platoons of the Marine Infantry Battalions of the USMC, here the II MEF, with a high degree of mobility and cross country capability. This together with the range of 3,950m of the TOW missile system, and the ability of the missile to penetrate any known armor, provides more than a match for advancing enemy tanks. In addition, if the terrain offers good hiding positions, the anti tank teams and their vehicles could defeat an attack by a tank unit and quickly turn it into their worst nightmare, littering the area with burning tank wrecks. This picture was taken during exercise "Purple Star 96" at Camp Lejeune in the USA.

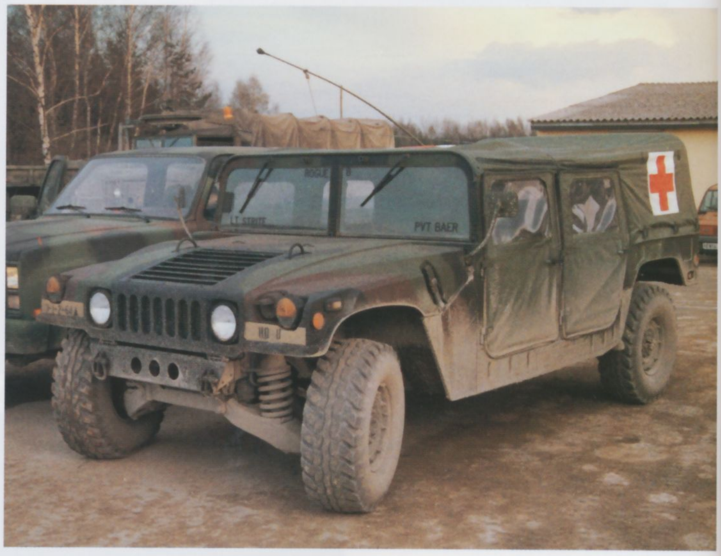


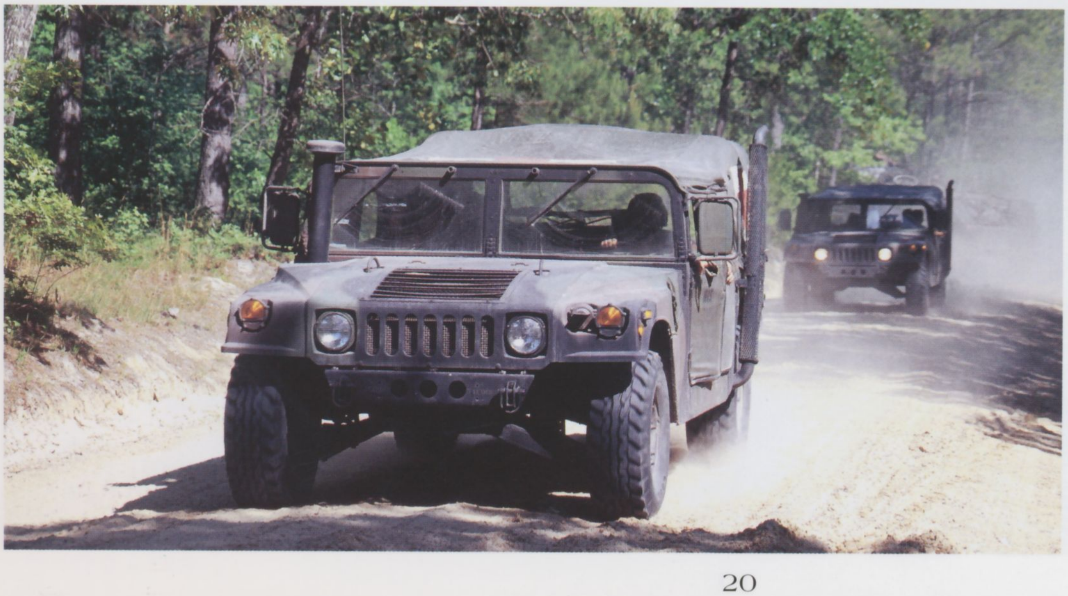
Since their introduction into service HMMWVs were often seen with troops on exercise at NATO's north European flank in Norway. This M1046 TOW missile carrier with supplemental armor and winch belongs to the II MEF of the USMC and has just been brought ashore by a LCAC in a Norwegian fjord. Even with a higher grade of protection, the supplemental armor still only provides limited protection from shrapnel and small arms fire and certainly does not stop rounds fired at point blank range.

Seen in May 1989 this M1035 soft top ambulance with two stretchers belongs to the HQ Company of the 2nd Battalion, 64th Armored Regiment of the 3rd Infantry Division. The M1035 is the smallest and only soft top version of the three known ambulances manufactured in the M998 HMMWV series. Basically the vehicle is an M998 cargo and troop carrier modified to take two, and in an emergency three, stretchers or four ambulatory patients. (Michael Jerchel)

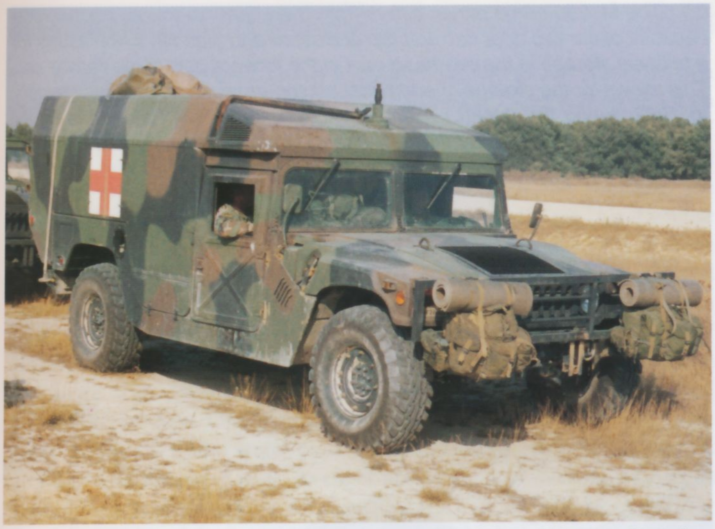


Used by the US Air Force this HMMWV version is based on the M966 TOW missile carrier with basic armor. This vehicle had recently received a new upper body shell with elevated roof. On the sides of the vehicle, hinged access doors are situated and to the rear a large door is mounted. The vehicle is used to transport the large amount of electronic equipment needed for ground-to-air communications. Note the HF antenna visible on the rear right side. The KFOR markings with the K painted in a different color identify the vehicle as one of a huge number of US military equipment transferred from the IFOR/SFOR mission in Bosnia to the KFOR deployment in Kosovo. A similar vehicle with supplemental armor was seen with the 1st Battalion, 33rd Field Artillery Regiment of the 1st Infantry Division.



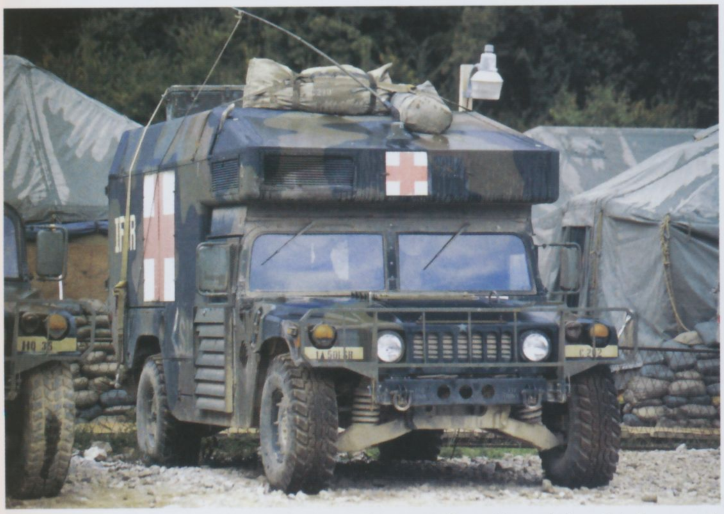


During exercise "Purple Star 96", this convoy of M1035 ambulances with soft top for two stretchers and belonging to the II MEF, was seen following the armored troops of the USMC with their M1A1HA and AAVP-7A1. Like all HMMWVs of the USMC the vehicles are fitted with extended exhaust pipes and air intakes. This upgrade raises the fording capabilities of the vehicle from 0.76m to 1.52m. The M1035 ambulances is rarely seen, and a USMC version is even more rare.

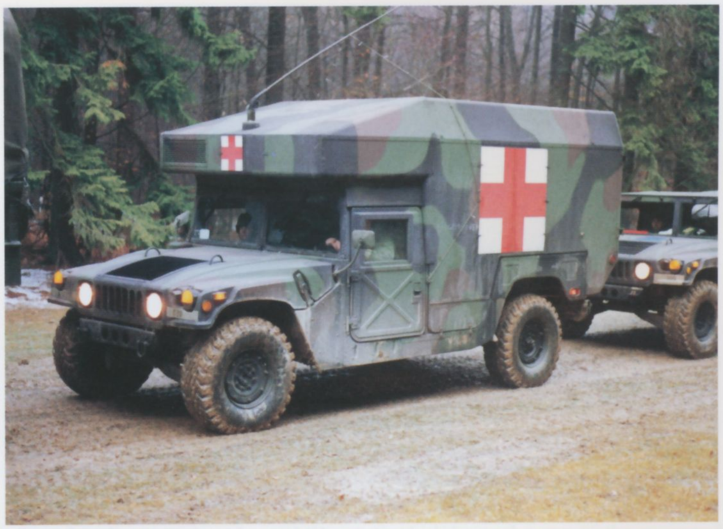


This M996 mini-ambulance belongs to the 3/325 Airborne Battalion Combat Team. Both it and the M997 maxi-ambulance are fitted with the basic armor package. This offers the same grade of protection to the crew as that of the M966 TOW missile carrier with basic armor and can easily be recognized by the distinctive X shaped pattern stamped into the doors. This vehicle was seen during the AMF(L) exercise "Alley Express" in October 1992. The M997 cannot be transported as an underslung load by a CH-47 Chinook, but both the M996 and the even lighter M1035 soft top ambulance can. This is the main reason why airmobile and airborne forces of the US Army are equipped with these vehicles. Note the brush guard that was seen on several vehicles from the 3/325 ABCT, which was not common on Army HMMWVs at that time.

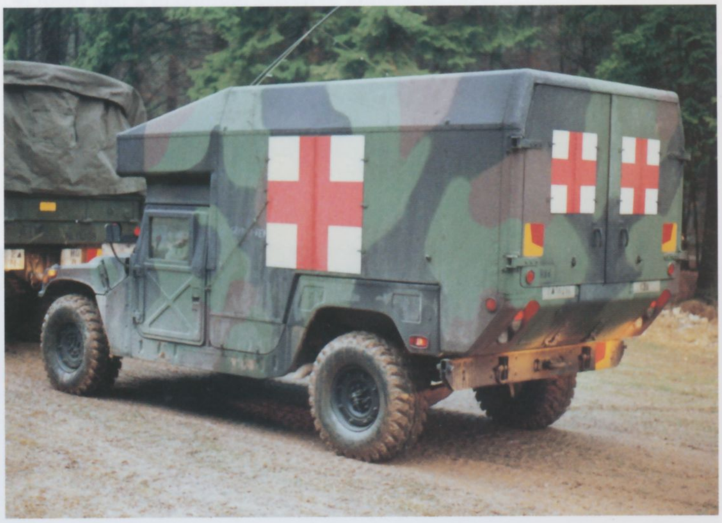
The M997 maxi-ambulance is the heaviest of the three ambulance versions of the M998 HMMWV series. This is due to the larger amount of medical equipment carried which permits a higher level of patient care. The M997 is fitted with an NBC protection and air conditioning system for use in contaminated areas. The rear view of the vehicle well illustrates the large doors, which are opened to the sides while the lower part is moved down and works as a step for easier access.

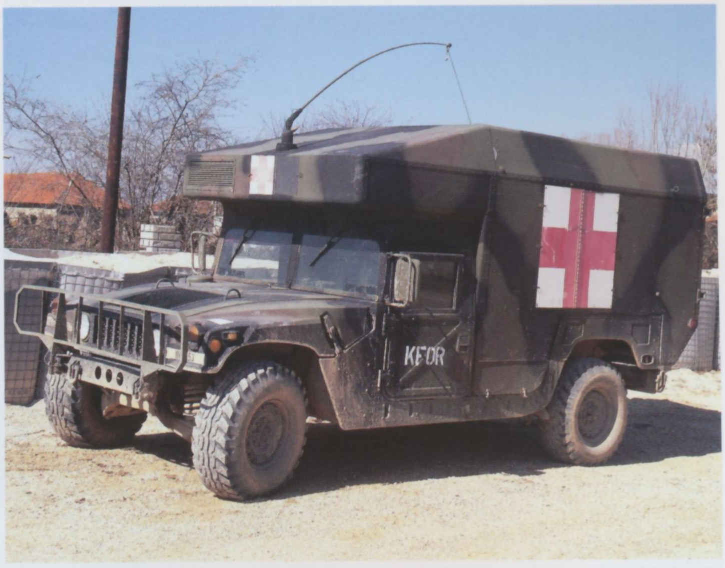


Belonging to the 501st Forward Support Battalion of the 1st Armored Division, this M997 maxi-ambulance with four stretchers and basic armor was seen in March 1996 with the US IFOR forces. The ambulance is fitted with a friend/foe identification system and additional kits are stored on the roof. It is a great example of what the military vehicles look like during combat operations. Note the brush guard, which although it is not manufactured by AM general, is routinely added by the unit workshops in order to protect the fragile fiberglass construction of the HMMWVs bonnet.

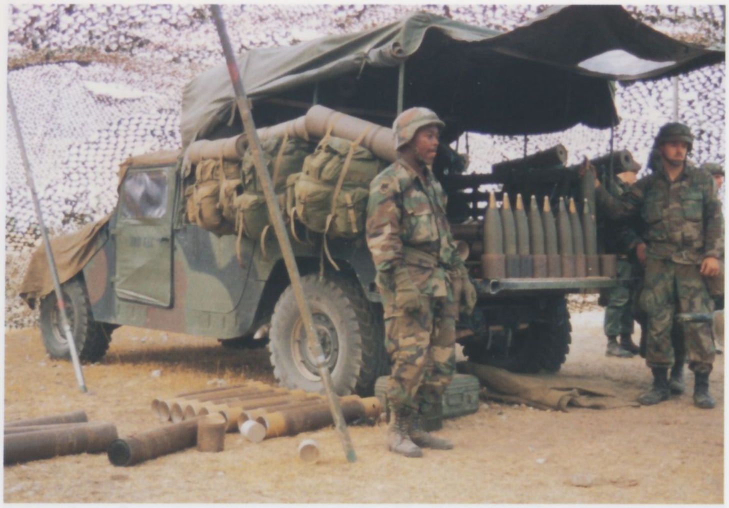


This M997 maxi-ambulance with four stretchers and basic armor was seen during the REFORGER 90 exercise "Centurion Shield" in Germany in January of 1990. In the rear compartment of the vehicle is a place for either four patients on stretchers, eight ambulatory patients or a mix of two on stretchers and four ambulatory patients. This vehicle belongs to the 502nd Forward Support Battalion of the 2nd Armored Division.



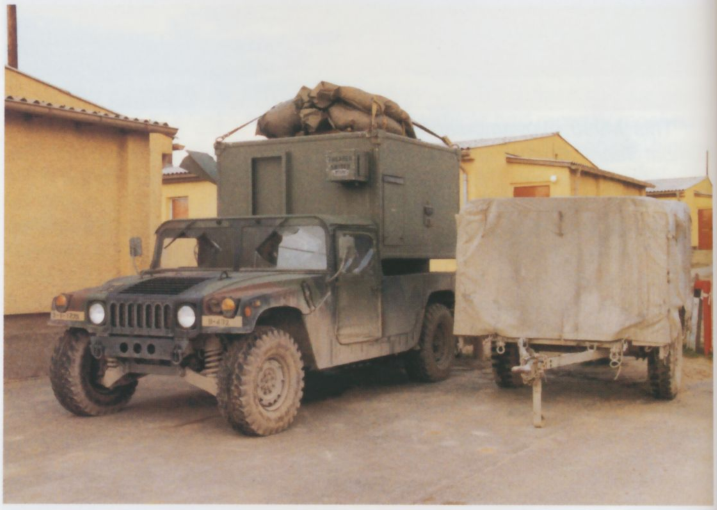


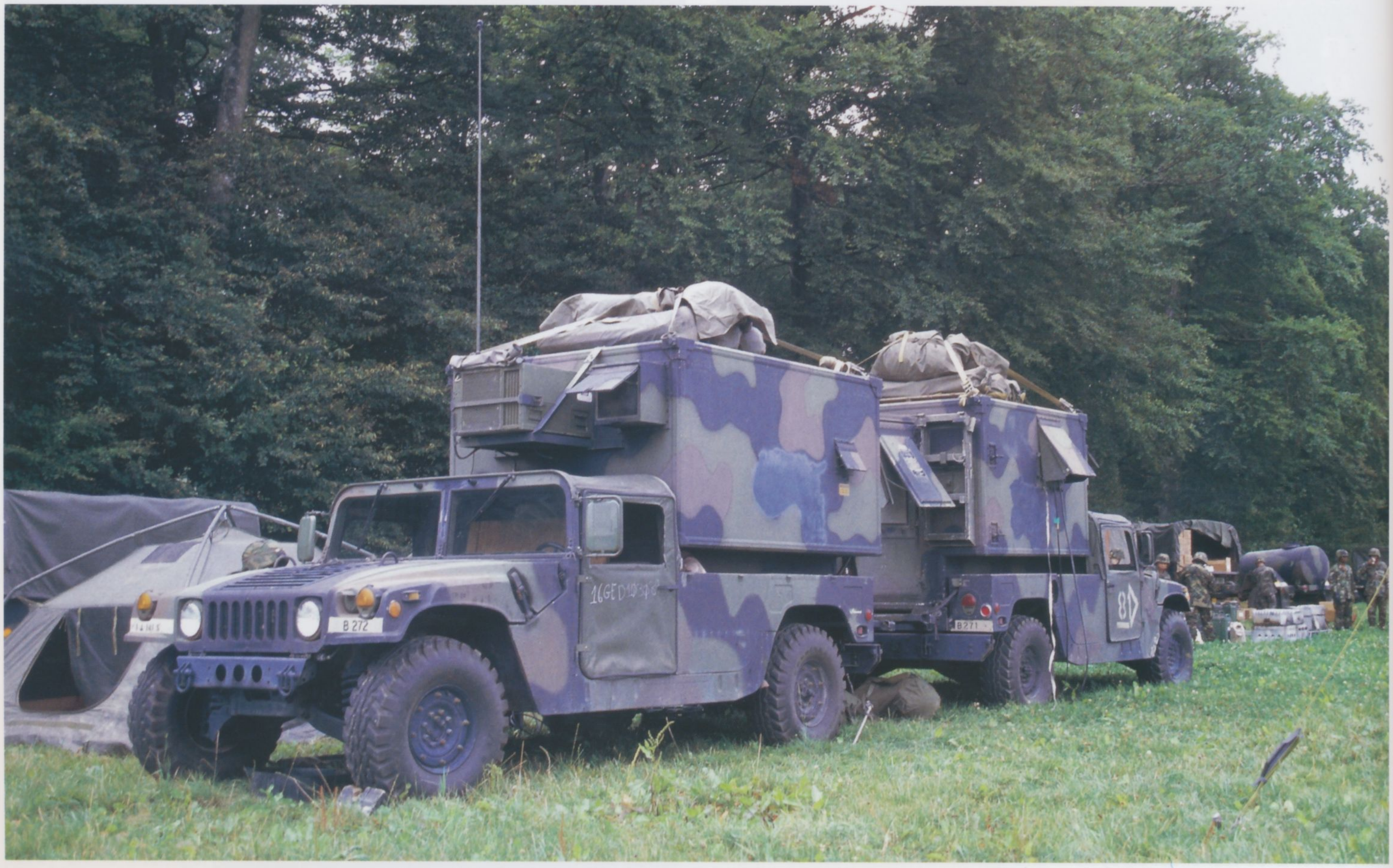
This M997 maxi-ambulance configured for four stretchers with basic armor belongs to the 1st Battalion, 178th Infantry Regiment, of the 101st Airborne Division (Air Assault). Clearly visible is the hinge of the red cross panel which allows this to be folded and makes camouflaging the vehicle much easier. This vehicle was seen in Kosovo in March 2000. The ambulances dimensions are: 2.59m high and 5.16m long.



The M1069 prime mover differs from the M998 cargo and troop carrier because of the two door cab soft top enclosure and high tilt, which allows for additional storage in the overhead rack in the forward part of the canvas cab. This allows for the storage of additional equipment such as camouflage nets. In 1992 during the AMF(L) exercise "Alley Express" in Turkey this M998, which can be identified by the absence of this rack, was seen in the prime mover role.

Seen in April 1990 at the Combat Maneuver Training Center in Hohenfels, this M1037 shelter carrier belongs to the 123rd Signal Battalion of the 3rd Infantry Division. On the vehicle the S-250 shelter used for command, communication, and control purposes can be seen. The M1037 and its sibling the M1042 shelter carrier with winch, are both fitted with a heavy duty suspension and modified electrical system. Brackets on the HMMWV's cargo bed secure the shelter by use of a cable and turnbuckle arrangement. (Michael Jerchel)

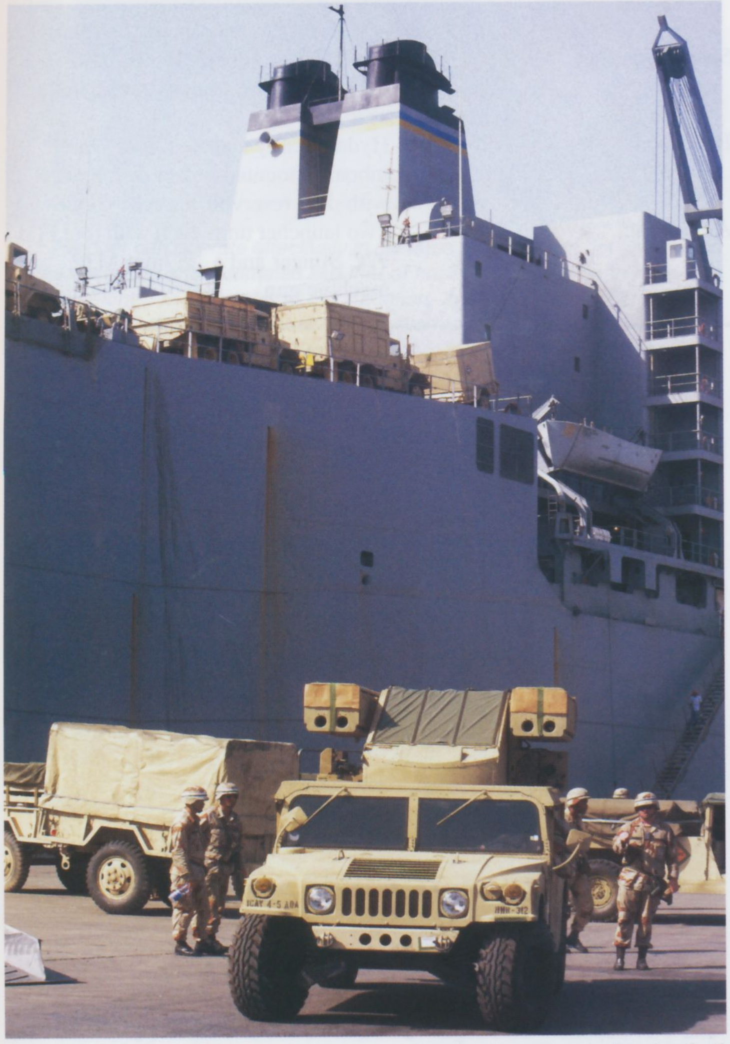




For command elements of US Army units the M1037 shelter carrier is used as a communications platform. The two vehicles in this picture are fitted with an S-250 electrical equipment shelter that has a payload of 862kg. The M1037 has a heavy duty suspension system and increased electrical capacity in order to provide the extra power needed by various electrical equipment such as radios, computers and intelligence electronics. This pair of M1037 was seen during exercise "Rolling Steel 99" and belongs to the Divisional Artillery of the 1st Armored Division.

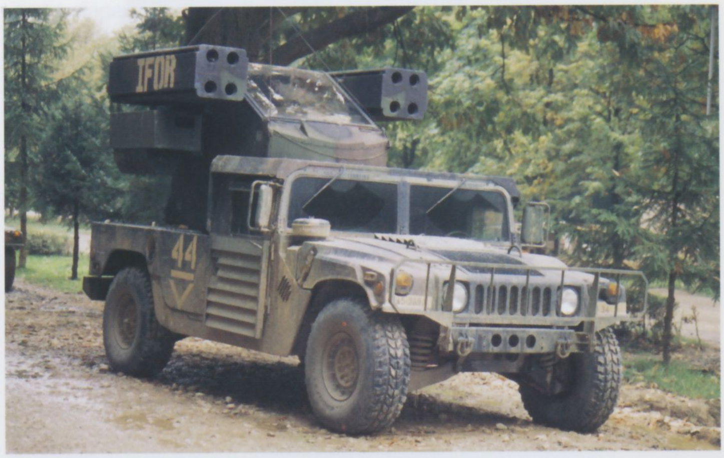
Avenger Air Defense Missile System

In 1977 the US Army began a program known as DIVAD (Division Air Defense) in response to a lack in its inventory. There was no shoot on the move air defense system available so they developed the M247 Sergeant York AA tank. However, the project failed due to technical and financial problems. In a new attempt to deal with the shortage, the Pentagon started a program known as the Forward Area Air Defense System (FAADS), which included, among other systems, the LOS-R (Line of Sight-Rear) or Pedestal Mounted Stinger (PMS) for which a proposal was made in 1986. Three systems were selected for trials and awarded a prototype contract for a single prototype mounted on the M1037 HMMWV Shelter Carrier. These systems included the following: Boeing Aerospace with Avenger, LVT Aerospace with Crossbow and General Dynamics/Thomson CSF/Hughes Electro-Optical Data System Group. After intensive trials were conducted, including live firing, target acquisition and tracking tests, Avenger of Boeing was selected. In August 1987 Boeing was awarded a five-year contract by the US Army Missile Command for the delivery of 273 fire units of which the first were handed over in November of 1988. The first unit to receive the Avenger was the 3rd Armored Cavalry Regiment. The Avenger became operational in 1989. The first operational deployment of Avenger was during the 1990-1991 Gulf War, however due to the Allied air superiority, the weapon system was not used in combat. Other deployments followed in Bosnia and Kosovo but, again, no use of the Avenger. It is believed that 1779 Avengers were produced for the US Army and an additional 275 for the USMC.

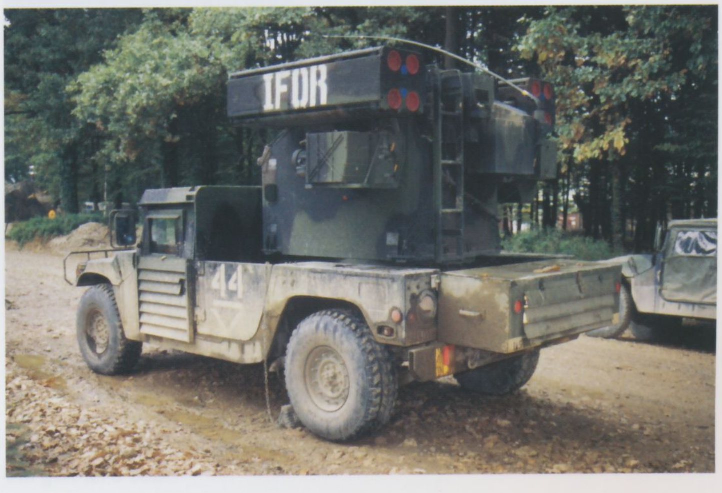


The first time the Avenger saw operational action was during the Gulf War. However, due to the Allied forces air superiority no missile was fired during the liberation of Kuwait. Here an Avenger of the 4th Battalion, 5th Air Defense Regiment of the 1st Cavalry Division can be seen while it was just being unloaded during the build-up of US Forces in November of 1990 at Damman harbor in Saudi Arabia. (Yves Debay)

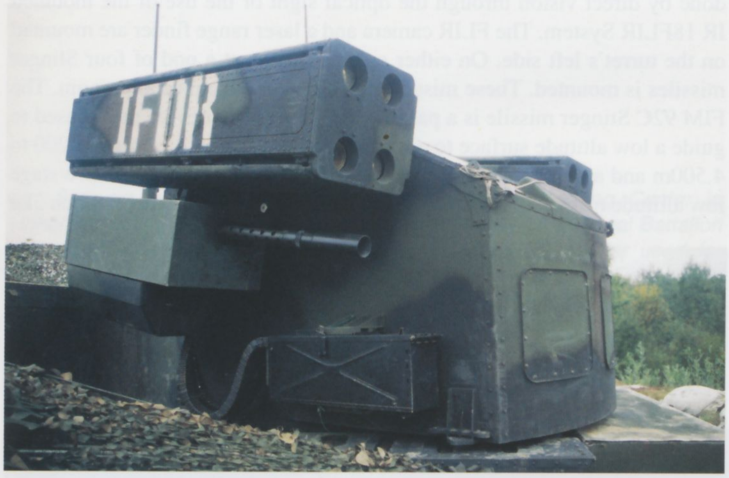
Avenger began its life as a private venture of the Defense System Division of Boeing Aerospace in the early 1980s. Development of this was conducted over a 10-month period, which was followed by test evaluations carried out by the US Army Air Defense Board between May and August 1984 at the Yakima Washington Firing Center. Firing tests included firing while on the move at 32km/h, during bad weather including rain and in both day and night operations. Out of 178 aircraft targets 171 were successfully engaged. Up until then the Avenger only consisted of a turret with eight Stinger SAMs in the ready to launch position. In 1985, the General Electrical GECAL-50 .50 Gatling Gun was added which was later replaced by the FN Herstal SA 12.7mm M3P machine gun. The Avenger is based on the M1037 HMMWV Shelter Carrier in which the turret is mounted on the rear using a frame of C steel profiles. The turret can be removed and deployed as a fixed stand-alone unit if required. The vehicle cab for driver and commander/gunner is fitted with an armored roof and the doors of the armament carrier with basic armor. Target acquisition is done by direct vision through the optical sight or the use of the mounted IR 18FLIR System. The FLIR camera and a laser range finder are mounted on the turret's left side. On either side of the turret a pod of four Stinger missiles is mounted. These missiles are constructed out of aluminum. The FIM 92C Stinger missile is a passive IR/UV homing device that is used to guide a low altitude surface to air missile with an effective range of 200 to 4,500m and a maximum effective altitude of up to 3,800m. The two stage low altitude missile is 1.52m long and has a weight of 10.1kg of which 3kg



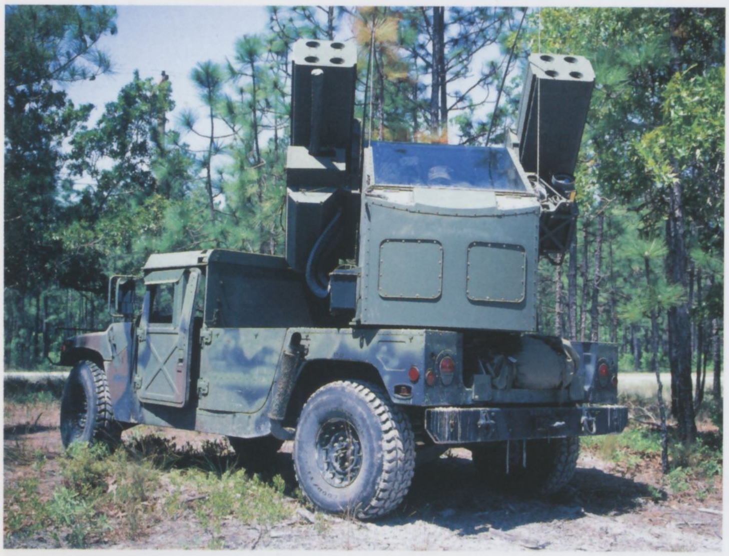
Among the US forces deployed in December 1995 into Bosnia as part of IFOR were air defense units equipped with the Avenger. These two pictures, taken in September of 1996, show a vehicle of the D Battery, 5th Battalion, 3rd Air Defense Artillery Regiment at Eagle Base in Tuzlar. It is believed that the louver plates on the cab doors, hood and rear storage box form part of a type of friend/foe identification system, which was tested in Bosnia by the US Army. Similar plates were seen mounted on a large range of tactical vehicles including M1A1HA main battle tanks, M981 FIST-V reconnaissance vehicles and M2A2 Bradley infantry fighting vehicles. Note that the 12.7mm M3P machine gun is not fitted.



is due to the HE fragmentation warhead with a contact fuse. The heater/ventilation assembly, the electronic system, the radio antenna and the boarding ladder are situated in the rear of the turret. Inside the electrically powered turret the AN/VRC 91 SINCGARS radio and the AN/VIC 1 intercom system are placed alongside the Stinger IFF AN/PPX3B interrogator, CAI optical sight, Magnavox FLIR, DBA automatic video tracker and Texas Instruments CO_ eye safe laser range finder. A Remote Control Unit (RCU), which is usually stored between the driver and commander/gunner, can be used when needed. The RCU consists of the FLIR unit and allows the crew to fully operate the weapon system via a 50m cable, which is located outside the vehicle. Ammunition reserves stored in the vehicles include additional 12.7mm rounds for the machine gun and eight missiles. In addition, there is also a Stinger grip stock, which is carried on the vehicle, for the use when the weapon is dismounted. Like the basic HMMWC Series vehicles the Avenger can be airlifted inside a C-130, C-141B and C-17 transport aircraft as well as transported as an under slung load by transport helicopters such as the CH-53 series or the UH-60.



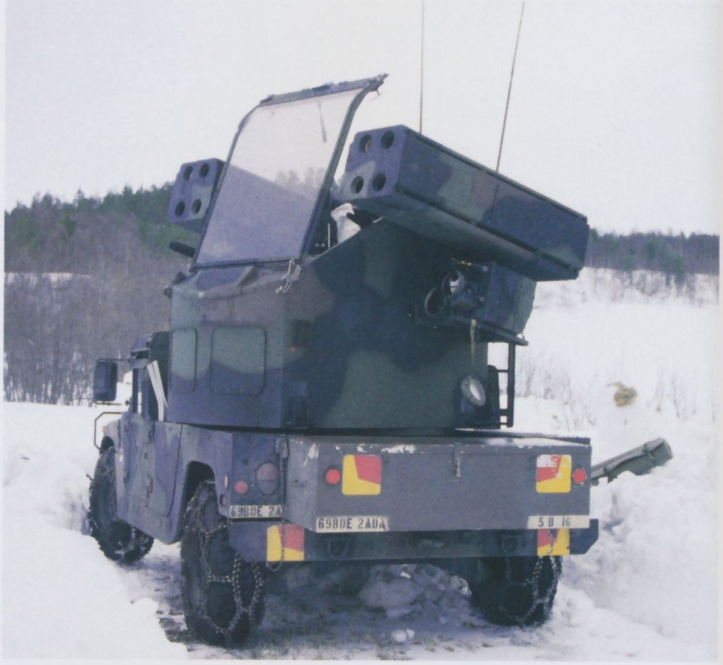
This detailed picture, taken at the Tuzlar airport in September 1996, is of an Avenger turret belonging to the US IFOR forces. Located under the 12.7mm M3P machine gun is the ammunition box for 200 rounds, ready to be used at any moment. In the launcher, the heads of four FIM 92C Stingers can be seen. The FN Herstal SA 12.7mm M3P machine gun is used for the protection of the launcher unit against ground targets and aircraft in the range of under 200m, the range before the Stinger can be used. The 12.7mm M3P has a cyclic rate of 1,100 rounds per minute.



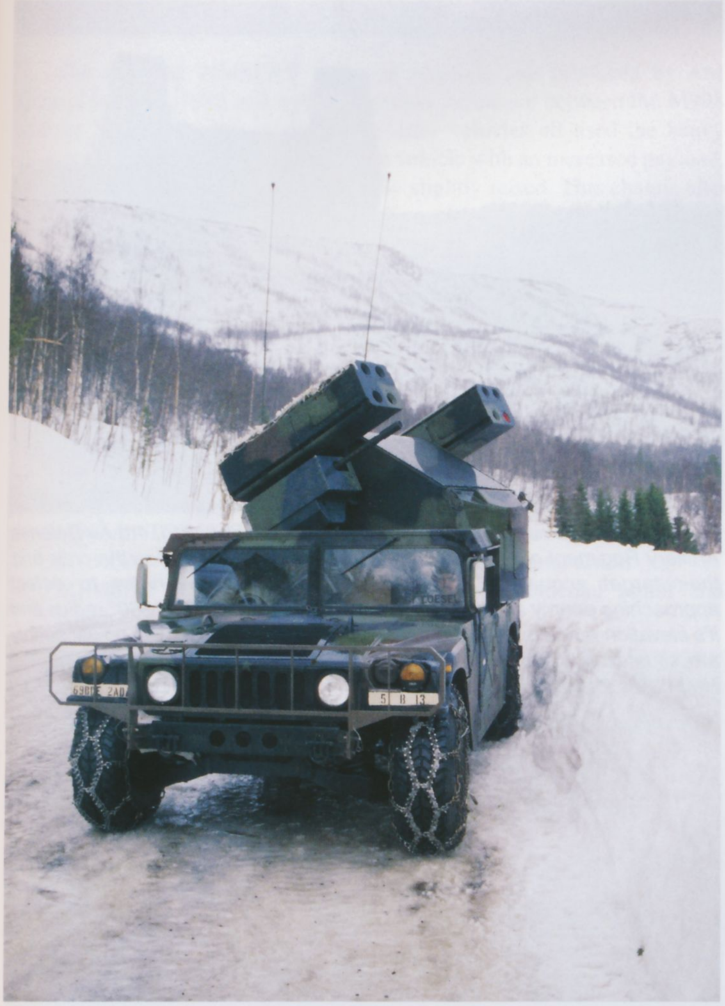
In addition to the US Army, Avenger is also used by the USMC, to which the vehicle in the picture belongs. The USMC Avenger can be easily identified by the extended deep-water exhaust, which can be seen in the picture. It is also identifiable by its hidden extended air intake pipe located to the vehicle's front left. The vehicle belongs to the air defense asset of the II MEF and was seen in the United States during the exercise "Purple Star 96". Note the gunner in the turret.

Technical data: Avenger Air Defense Missile System

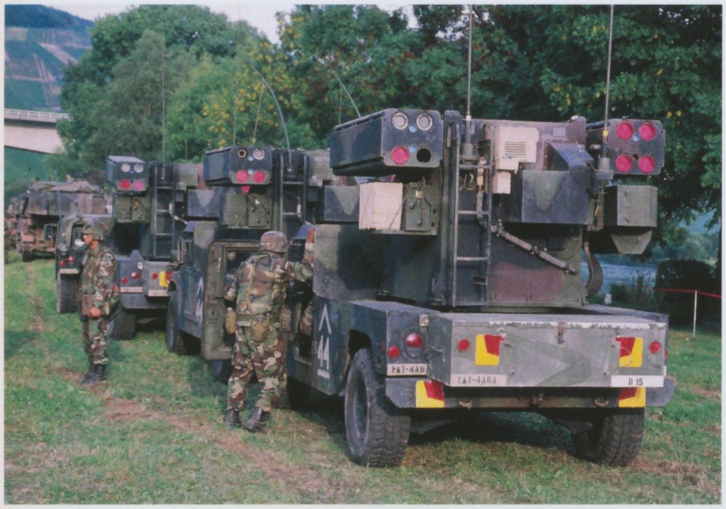
Engine type:	General Motors 6.2 liter V-8 Turbo diesel engine.
Horsepower at 3,600 RPM:	150 HP
Maximum speed:	105 km/h
Combat weight:	3,900 kg
Weight of turret:	1,134 kg
Fuel tank capacity:	94 liters
Crew:	Driver and Commander/Gunner
Wheelbase:	3.3m
Overall length / width / height:	4.95m / 2.18m / 2.59m
Track width:	1.82m
Ground clearance:	0.4m
Turning radius:	7.62m
Angle of approach:	69° degrees
Angle of departure:	45° degrees
Cruising range:	563 km
Fording:	0.76m, with extra kit 1.52m
Transmission:	General Motors THM 400 three speed automatic transmission coupled with a 2-speed full time four wheel drive transfer box
Wheels and tires:	16.5x 8.25, wheel with 1,747kg capacity. Tires are 37x 12.5 R 16.5 LT load range "D" radial with low profile run flat device on two piece take apart wheel. Flat run capability is 48 km
Suspension type:	Independent double A frame with open end coil springs and hydraulic shock absorbers
Brakes:	Hydraulically actuated, four wheel inboard mounted power disc brakes with dual reservoir master cylinder.
Armament:	Two launcher units each with four FIM 92C Stinger and a 12.7mm M3P machine gun.



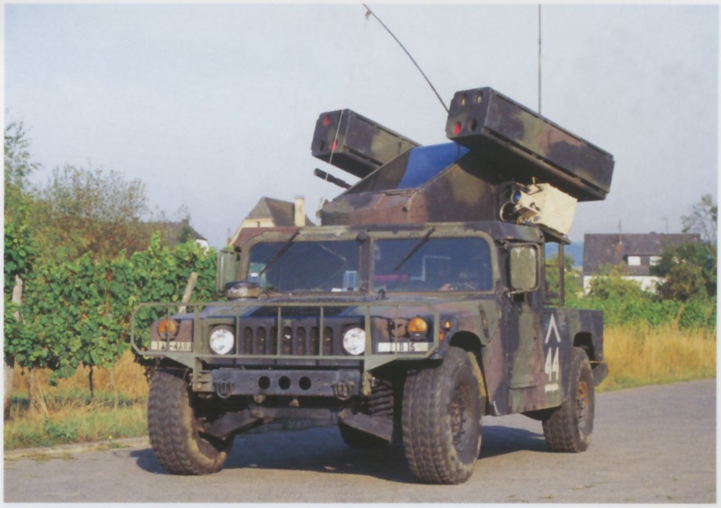
This rear view of an Avenger, which was seen during the AMF(L) exercise "Strong Resolve 98" in northern Norway, allows you to see the transparent canopy in its open position while the gunner is getting into position. The vehicle belongs to the 5th Battalion, 2nd Air Defense Regiment, which then was based in Bamberg, Germany. The launch arms are elevated and you can see that the Texas Instruments laser range finder and Magnavox FLIR camera can move simultaneously.



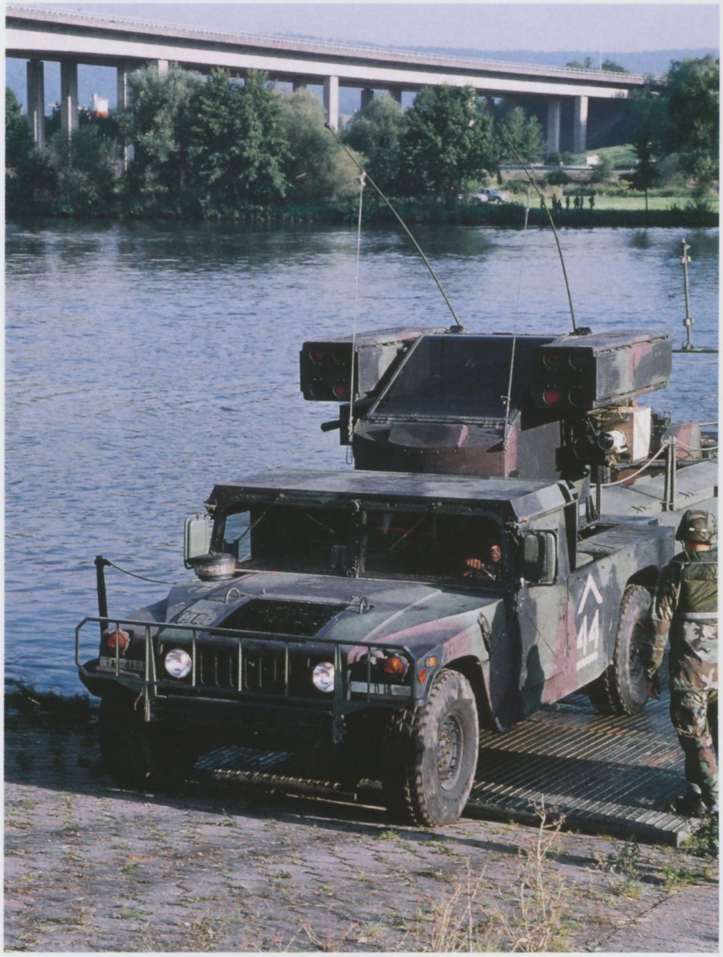
Avenger can operate effectively in climates ranging from hot ones, such as the desert, to arctic climates like that of northern Norway seen here. The vehicle belongs to B Company, 5th Battalion, 2nd Air Defense Regiment of the 69th Air Defense Artillery Brigade which is attached to the AMF(L). It was seen during the exercise "Strong Resolve 98". In total 18 Avengers form a platoon in the battalions of the air defense regiment. Note the snow chains fitted on the vehicle's tires.



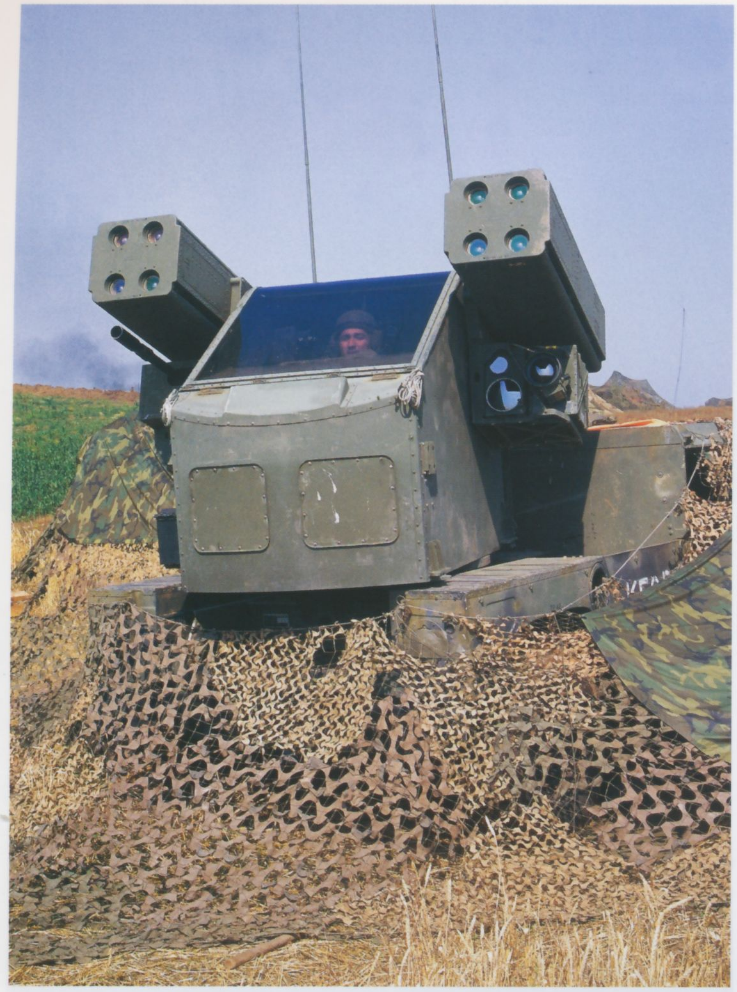
In the US Army, the Avenger is used in battalion size formations on Division and Corps levels. However, in some cases Avenger is also used directly in combat formations. For example, the air defense section of an armored cavalry regiment, which is part of regimental headquarters and headquarter troops, can field an air defense section of six Avengers. Here three Avengers of D Battery, 1st Battalion, 4th Air Defense Artillery Regiment of the 1st Armored Division can be seen during the exercise "Rolling Steel 99". Note the large storage box, which was added to allow the crew storage space for their personal kits as the space inside the vehicle is very limited.



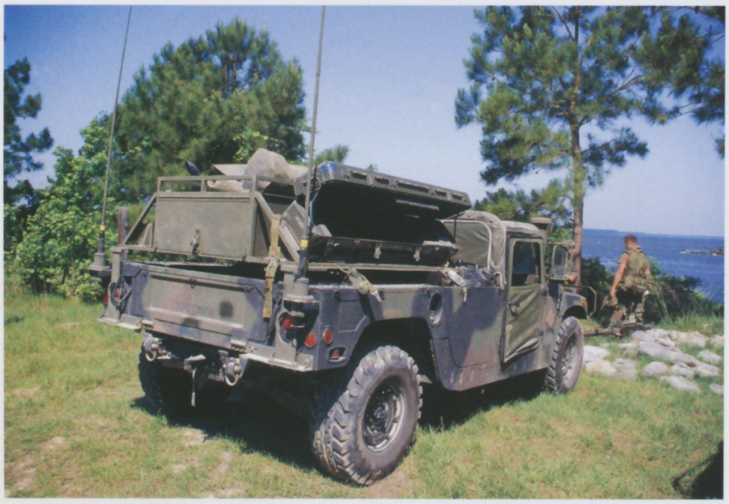
The HMMWV based Avenger Air Defense Missile System was the first air defense system in the US Army inventory with shoot on the move capabilities. Based on the M1037 shelter carrier, the Avenger consists of a turret fitted with two launcher units for FIM 92C Stinger SAMs, a 12.7mm machine gun and the necessary target acquisition, sighting and fire control systems. With the Avenger it is possible to hit a flying target while the vehicle is moving at a speed of 32 km/h over a less than perfect road. The pictured Avenger belongs to the 1st Battalion, 4th Air Defense Artillery Regiment of the 1st Armored Division and was seen during the exercise "Rolling Steel 99" in Germany. Note that the FLIR camera container is painted in desert camouflage while the rest of the vehicle is painted in the brown, black and green standard NATO camouflage pattern.



Here, an Avenger is leaving a ribbon bridge built over the German river Mosel by the 565th Engineer Battalion of the 130th Engineer Brigade during the exercise "Rolling Steel 99". The Avenger belongs to the 1st Battalion, 4th Air Defense Artillery Regiment of the 1st Armored Division. The picture provides a good view of the large transparent canopy used for all round observation in the electrically operated turret. Located behind the turret is the gunner's seat.

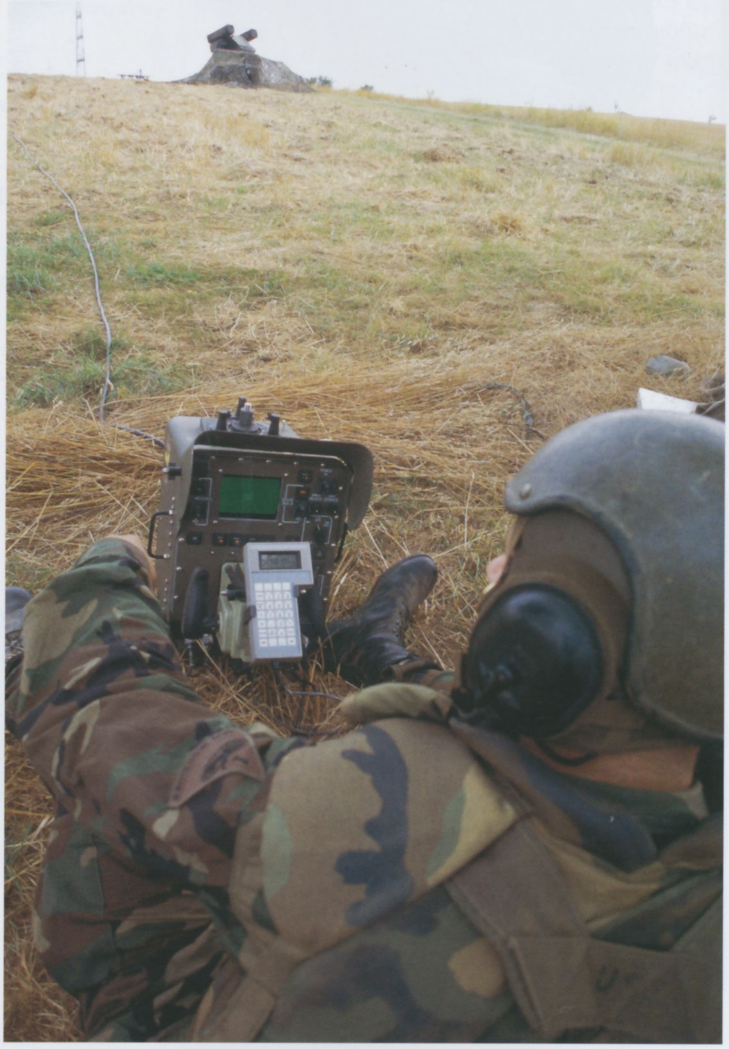


Even with NATO air superiority, the USMC deployed Avenger into Kosovo in June of 1999. Seen in early July in Kosovo this Avenger belongs to the 26th Marine Expeditionary Unit (Special Operations Capable) and provides protection for Camp "Monteith," the Marines Forward Operating Base outside Gnjilane. Under the right launcher pod armed with four FIN 92C Stinger missiles, the laser range finder and the FLIR camera can be seen. Also visible under the left launcher pod is the 12.7mm M3P machine gun. The gunner in the turret is wearing a Combat Vehicle Crew Helmet, which is connected to the vehicle's intercom and allows for communication with the driver or to other fire units via the radio system.



Another HMMWV version used by the US Armed Forces to make Stinger mobile is an M998 cargo and troop carrier fitted with racks to hold the launcher unit and spare missiles. This vehicle from the Low Altitude Air Defense Battalion of the II MEF can be seen during exercise "Purple Star 96" in the United States. The crew can be seen with the Stinger shoulder launcher in the front of the vehicle. The vehicle is also used in a configuration with a hardtop where the Stinger missile launchers are carried in the side compartment

Due to its camouflage this Avenger of the 1st Battalion, 4th Air Defense Artillery Regiment can be seen on high ground. This provides the crew and their target acquisition systems with a perfect overview to detect approaching enemy aircraft. The turret can operate within a 360° radius and it's elevation range is between –10° and +70°. Batteries for the power supply are situated in the base of the turret and are connected parallel with the HMMWV's 24 volt system.

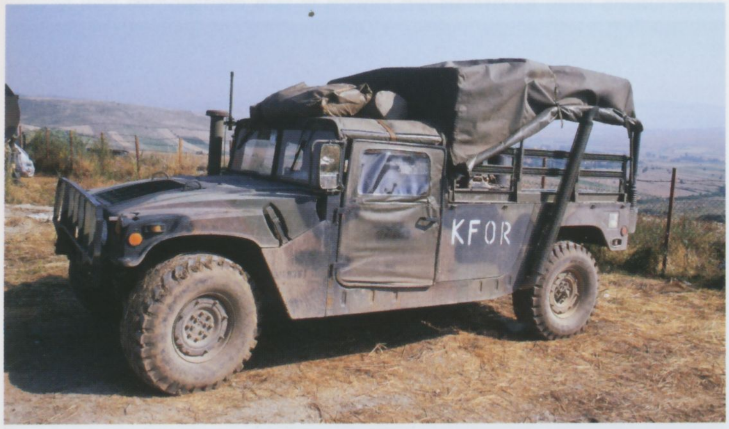


The Remote Control Unit (RCU) allows the crew to operate Avenger from a remote position of up to 50m away from the vehicle, as seen in this picture. The RCU consists of the same control units and displays that are fitted in the turret, including a FLIR monitor, Built In Test Equipment (BITE) and hand control switches. The RCU can also be used to operate Avenger from the passenger seat while the vehicle is on the move and the weapon station in the turret is not manned. As well it can be used when the turret is removed from the chassis.

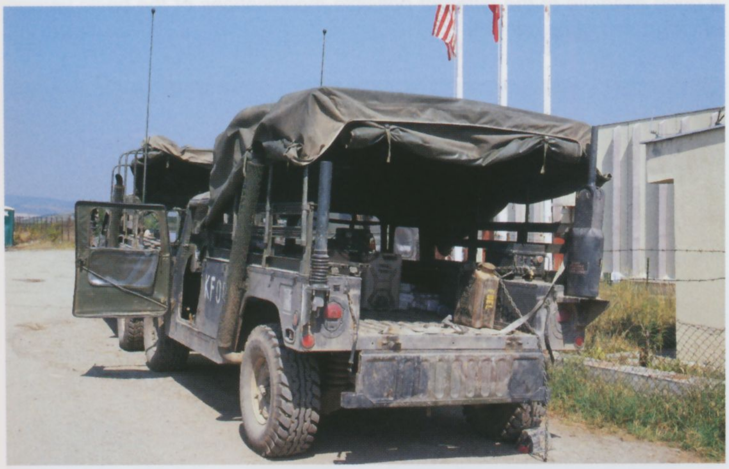
The M998A1 HMMWV Series

The M998A1 HMMWV series of vehicles was produced by AM General between 1993 and 1995. The main difference between the M998 and the M998A1 series was that the latter vehicles all used the heavy chassis of the M1097. This provided the vehicle with an increased payload, while the gross vehicle weight was only slightly raised. This chassis also included new prop shafts, improved differentials, a new lower ball joint, a new transfer case, a modified frame mounting for the steering gear, and variable rate rear springs. To enhance the travel safety of troops, new front seats and modified rifle mounts were fitted in the M998A1 series. Other modifications included work on the parking brake, the half shafts, the slave receptacle and the glow plug controller. All M998A1 vehicles were also fitted with a new type of metal hood grill and two new truck type mirrors. The range of variations in the types of vehicle was reduced with the M998A1 HMMWV Series and featured the following models:

- M998A1 Cargo Vehicle
- M1038A1 Cargo Vehicle with winch
- M966A1 TOW Missile Platform with basic armor
- M1045A1 TOW Missile Platform with supplemental armor
- M1046A1 TOW Missile Platform with supplemental armor and winch
- M1025A1 Armament Carrier with basic armor
- M1026A1 Armament Carrier with basic armor and winch
- M1043A1 Armament Carrier with supplemental armor
- M1044A1 Armament Carrier with supplemental armor and winch
- M997A1 Maxi-ambulance for four stretchers with basic armor
- M1035A1 Ambulance with soft top for two stretchers
- M1097A1 HHV (Heavy Hummer Variant)
- M1069A1 Prime Mover



In its first years TACP of the US Army and USMC were equipped with HMMWVs with four doors and a soft top enclosure. Later on, due to the large amount of communications equipment they carried, they received vehicles with the high tilt such as the one shown here. This M998A1 cargo vehicle is of the two door, soft top configuration. Note that, where on the M998 HMMWV Series vehicle the mounting for the side mirror was placed, now only the rivets of the body construction are visible. This is a major identification point from the outside of the vehicle. This particular vehicle belongs to the 26th MEU, II MEF of the USMC and was seen in Kosovo during Operation "Joint Guardian" in June of 1999 at Camp "Montheith".

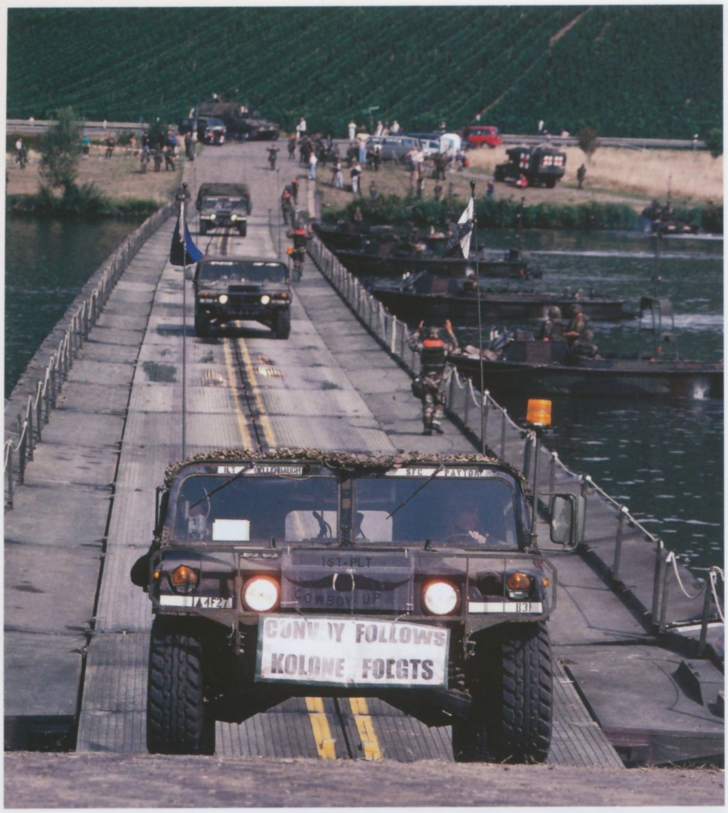


Note the extended exhaust pipe, different antenna, radios, with bench and rear rest for troop transport. This M998A1 cargo vehicle has two doors, a soft top enclosure and high tilt and is from the 26th MEU. A common practice by troops can be seen inside the left door: The transparent soft plastic window is pulled inside the vehicle and then secured under the cross section of the metal frame of the door.

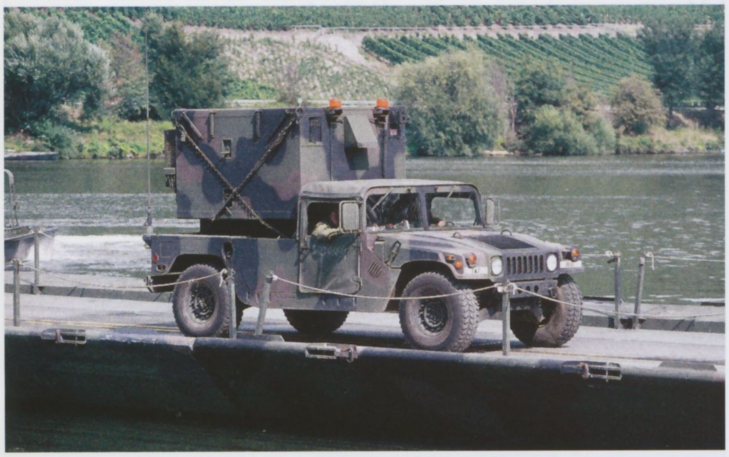
From the outside it is very difficult to distinguish the difference between the M998A1 HMMWV and the basic M998 HMMWV Series. Upon closer inspection one difference is the metal hood grill. However, this is not always accurate as the armament carriers of the M998 HMMWV Series also have a similar grill style. Another difference is the larger, truck-type mirrors introduced with the M998A1 HMMWV Series. Again, this is not always a reliable distinction as most vehicles of the M998 HMMWV Series were later upgraded to include these mirrors. When this upgrading was performed the mounting for the old mirror was left in place on the M998 HMMWV Series vehicle. This is of course missing on the M998A1 HMMWV Series. When looking carefully this mount can be seen under the windshield on both the left and right side of the vehicle. Although almost 20,000 of the M998 HMMWV Series were manufactured, this is still small compared to the total number of HMMWVs produced. Keeping this in mind, most vehicles of the US armed forces seen in action are actually upgraded M998 HMMWV Series vehicles rather than M998A1 HMMWVs.

Technical data: M998A1 Series HMMWV (M1038 Cargo Troop Carrier with winch)

Engine type:	General Motors 6.2 liter V-8 Turbo diesel engine.
Horsepower at 3,600 RPM:	150 HP
Maximum speed:	113 km/h
Curb weight:	2,544 kg
Payload:	1,030 kg
Gross vehicle weight:	3,574 kg
Maximum towed load:	1,542 kg
Fuel tank capacity:	94 liters
Seating capacity:	1 + 3
Wheelbase:	3.3 m
Overall length / width / height:	4.72m / 2.18m / 1.83m
Track width:	1.82m
Ground clearance:	0.4m
Turning radius:	7.62m
Angle of approach:	47° degrees
Angle of departure:	45° degrees
Acceleration:	0 km to 48 km in 8 seconds 0 km to 80 km in 24 seconds
Cruising range:	482 km
Fording:	0.76m, with extra kit 1.52m
Transmission:	General Motors THM 400 three-speed automatic transmission coupled to a 2-speed full time four wheel drive transfer box
Wheels and tires:	16.5x 8.25, wheel with 1,747kg capacity. Tires are 37x 12.5 R 16.5 LT load range "D" radial with low profile run flat device on two piece take apart wheel. Flat run capability is 48 km
Suspension type:	Independent double A frame with open end coil springs and hydraulic shock absorbers
Brakes:	Hydraulically actuated, four wheel inboard mounted power disc brakes with dual reservoir master cylinder.

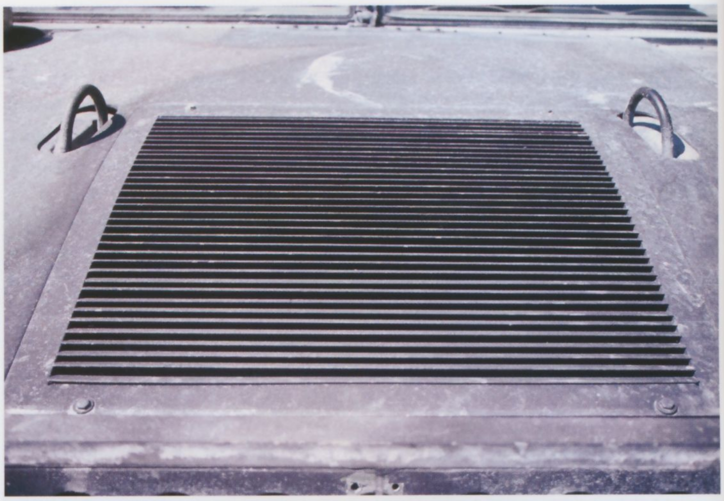


Here an M998A1 cargo vehicle with four doors and the soft top enclosure can be seen during exercise "Rolling Steel 99". It is leading a convoy of HMMWVs followed by artillery equipment over a ribbon bridge. The vehicle belongs to B Battery, 4th Battalion, 27th Field Artillery Regiment. Note the platoon plate on the brush guard of the vehicle and the crew names painted on the frame of the windshield. This is unusual as normally the names are written on the lower edge of the glass itself.

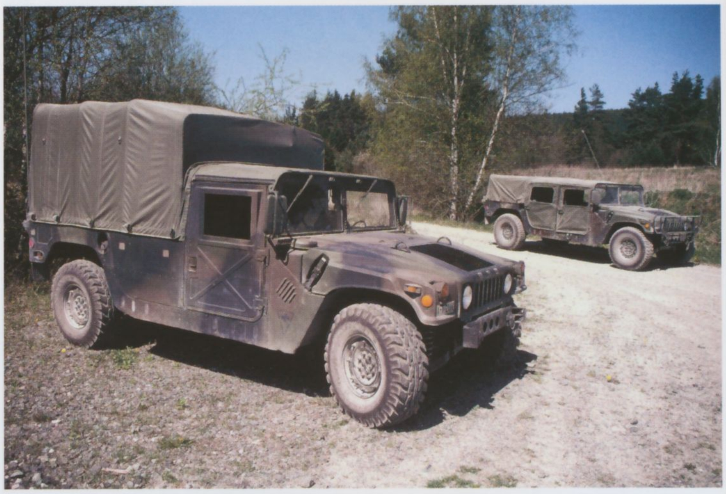


Here an M998A1 cargo vehicle with two doors and the soft top enclosure can be seen performing the role of the M1037 shelter carrier. Apparently in the M998A1 HMMWV Series the vehicles were not numbered separately. This vehicle belongs to the Headquarter and Headquarter Battery of the Divisional Artillery of the 1st Armored Division and was seen crossing a ribbon bridge over the river Mosel during exercise "Rolling Steel 99".

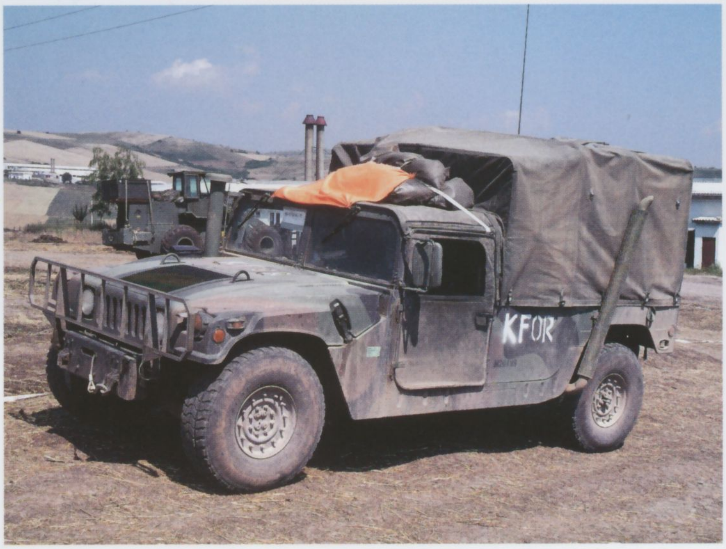
Another vehicle seen with the 26th MEU in June of 1999 in Kosovo was this M1038A1 cargo vehicle. It is outfitted with a winch, two doors, a soft top enclosure and high tilt. This can be easily identified as the mounting for the old mirror does not exist and the new metal hood grill is clearly visible. Note the orange marker panel on the roof. This is used for friend/foe identification making the units clearly recognizable to combat aircraft pilots, even from a long distance. Ever since the Gulf War this has been a common practice used by allied troops to prevent blue on blue contact. However, the markings do not provide 100 percent security. An example of this was seen during the Gulf War when an American A-10 Thunderbolt attack aircraft destroyed a British Warrior infantry-fighting vehicle that had been using the orange panels.

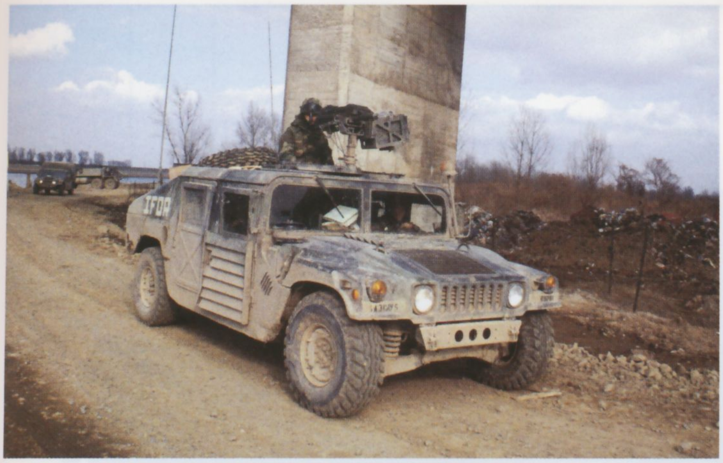


All vehicles from the M998A1 HMMWV Series were fitted with a new metal hood grill. This same grill was also installed during the upgrading of the M998 HMMWV Series vehicles to the A1 standard. Even from the beginning of production a similar grill was already being used on all armament carrier versions of the M998 HMMWV Series.

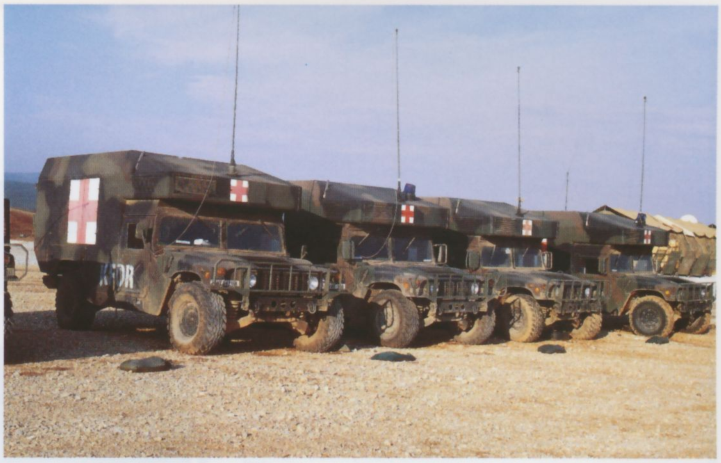


The M998A1 cargo vehicle in the foreground is fitted with two doors, a soft top enclosure and high tilt which is probably used for cargo and troop transport. An uncommon feature is the doors, which are of the type used in armament carriers with basic armor. This vehicle was seen in April 2000 during gunnery training of the 1st Battalion, 77th Armored Regiment on the Grafenwöhr training area in Germany and belong to an unidentified unit. In the rear, an M998 cargo vehicle with four doors and a soft top enclosure is a good example of the different possible modifications of the basic version of cargo and troop carriers.



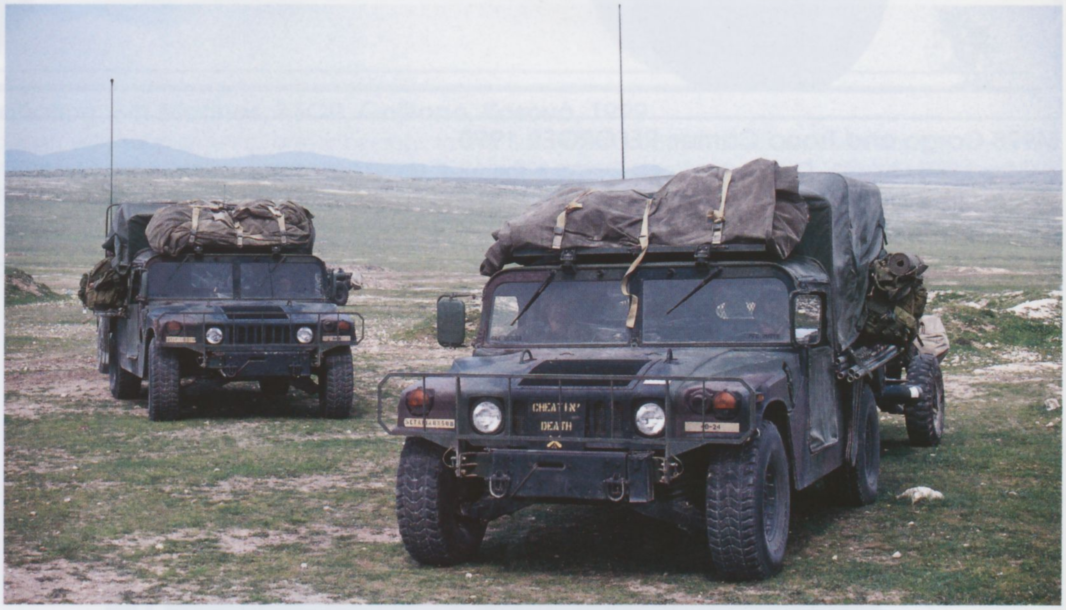


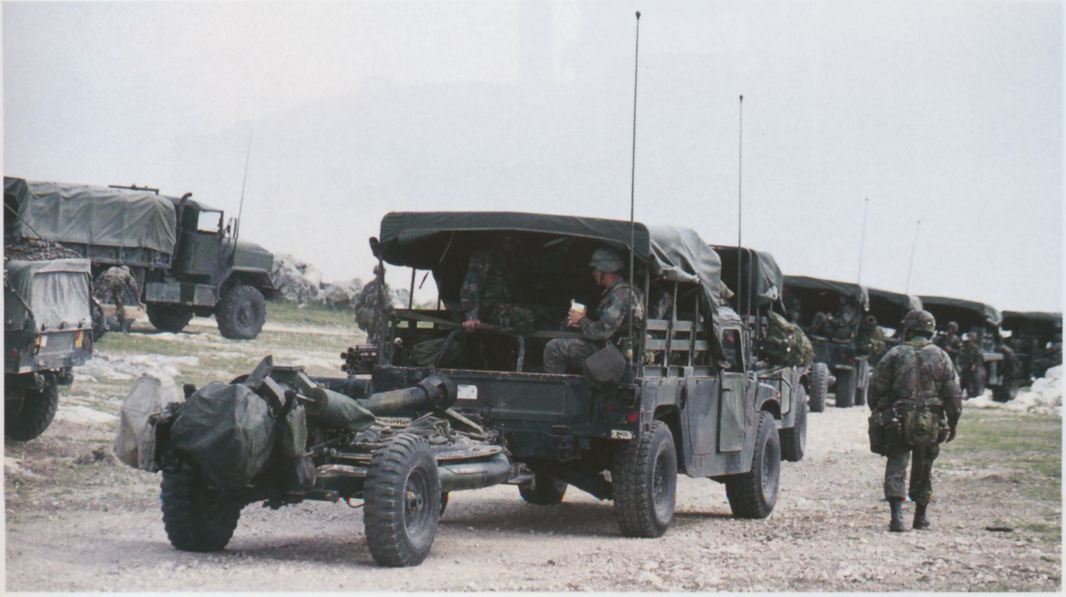
Fitted with a 40mm Mk.19 automatic grenade launcher this M1025A1 armament carrier with basic armor was pictured only eight weeks after the first US troops crossed the Save river into Bosnia in early January of 1996 near the head of the ribbon bridge. It belongs to the 3rd Squadron, 5th Cavalry Regiment and like all armored vehicles of the US Army in Bosnia is fitted with the friend/foe identification panels. Note that on the large rear door of the vehicle a spare wheel is carried. The muddy conditions of the vehicle well demonstrate that in Bosnia the HMMWVs often encountered bad roads and rough conditions. This forced the vehicles to use all of their cross country abilities and tested the toughness of the vehicle on a daily basis.



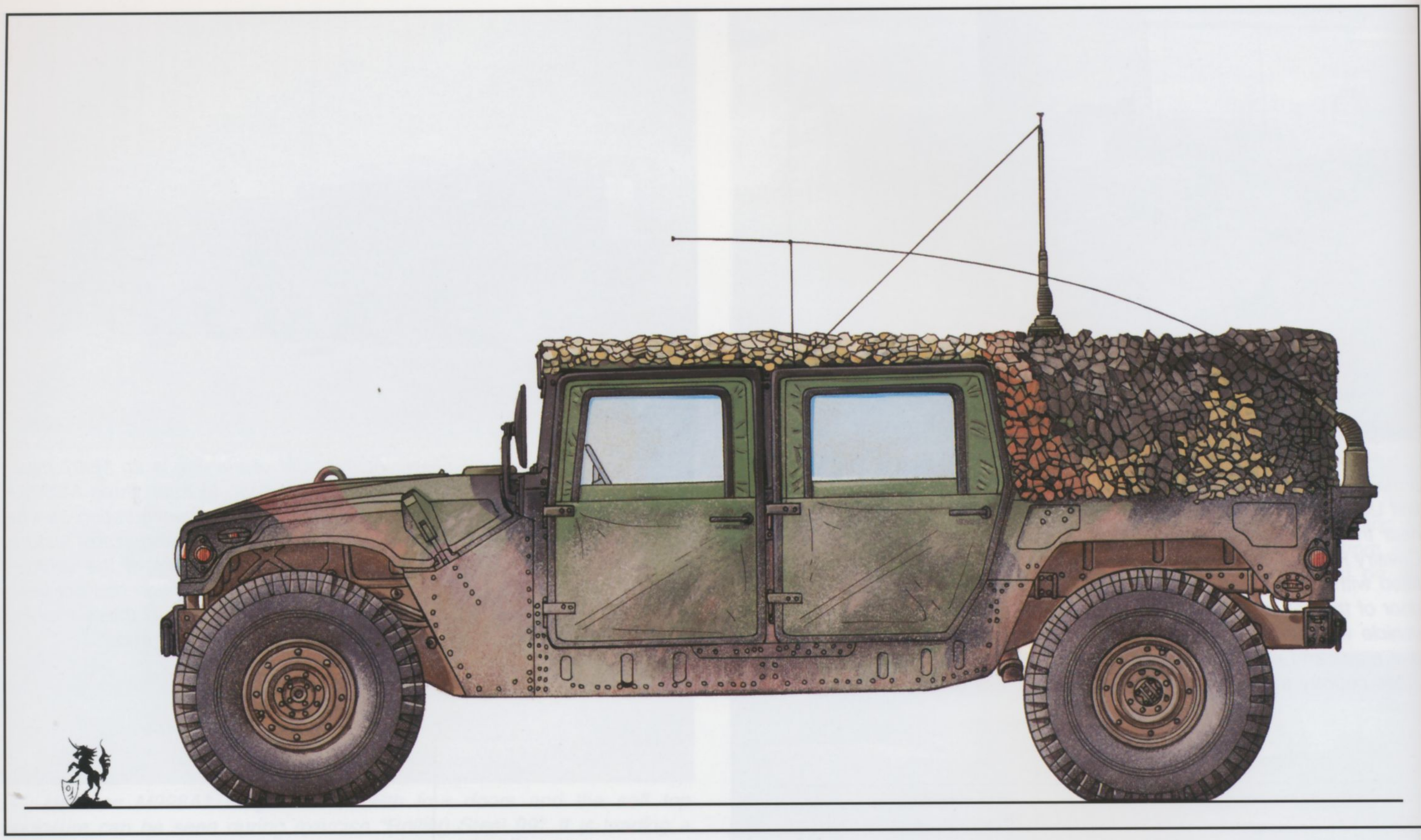
July in Camp "Bond Steel": At the front of the line is an M997 maxi-ambulance with four stretchers and basic armor. In total, three M997A1 maxi-ambulances in the four stretcher, basic armor configuration can be seen. Note that at this distance the mirrors are the only recognizable feature. Some may also be upgraded basic series vehicles. Two of the vehicles though have had blue warning lights installed. This addition has not been seen before by the author, which makes it possible that these two are M997A1 maxi-ambulances with four stretchers and basic armor.

The M1069A1 HMMWV prime mover is basically an M1038A1 cargo vehicle with a winch, high tilt, two doors and a soft top enclosure. The major difference is that it is built on the M1097A1 HHV chassis. This vehicle has a greater payload area due to the addition of a roof rack where gun crews can store extra equipment, as pictured here. These vehicles belong to the gun battery of the 319th Airborne Field Artillery Regiment, which is attached to the 3/325 ABCT as part of SETAF. Both vehicles are towing the M119 105mm Light Gun that is made by Royal Ordinance in the UK. Note that the first vehicle is named "Cheatin Death".



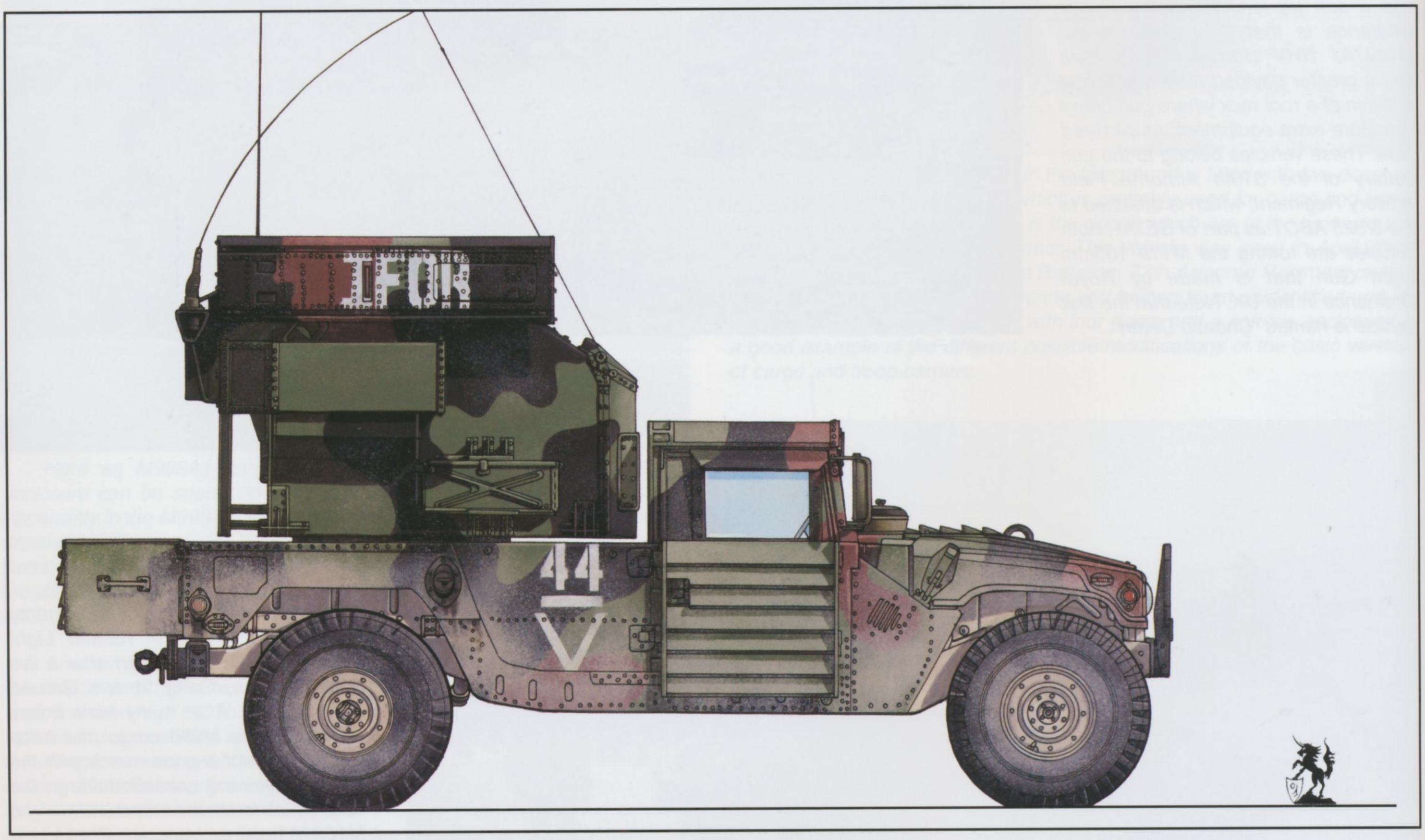


A column of M1069A1 prime movers towing M119 105mm Light Guns leave a gun position after a live firing exercise during "Ardent Ground 97" in Turkey. After many trials it was found that the M998 cargo and troop carrier was not a good match with the M119. It was too uncomfortable in the field, which led to the introduction of the M1069A1 prime movers. These are based on the M1097A1 HHV chassis. Note the gun crew and their kits crammed into the vehicles rear compartment.



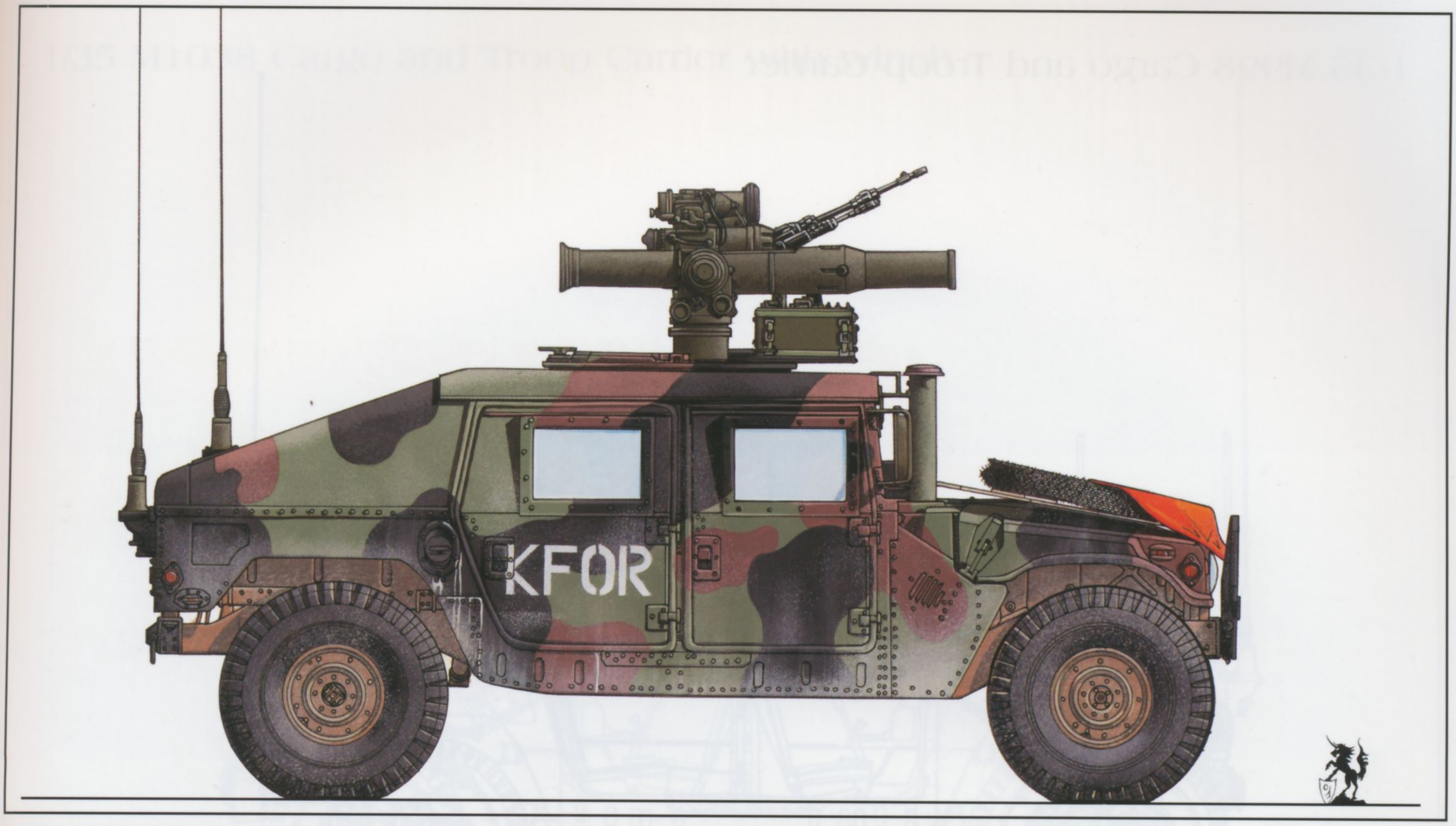
M998 Cargo and Troop Carrier, REFORGER 1990

The M998 HMMWV Cargo and Troop Carrier is the most commonly seen version of the HMMWV series. The vehicle is shown in the basic configuration with the soft top enclosure, four seats and four doors. Like during the REFORGER 1990 exercise "Centurion Shield", HMMWV are often camouflaged by netting which is fastened on the roof and the sides of the vehicle.



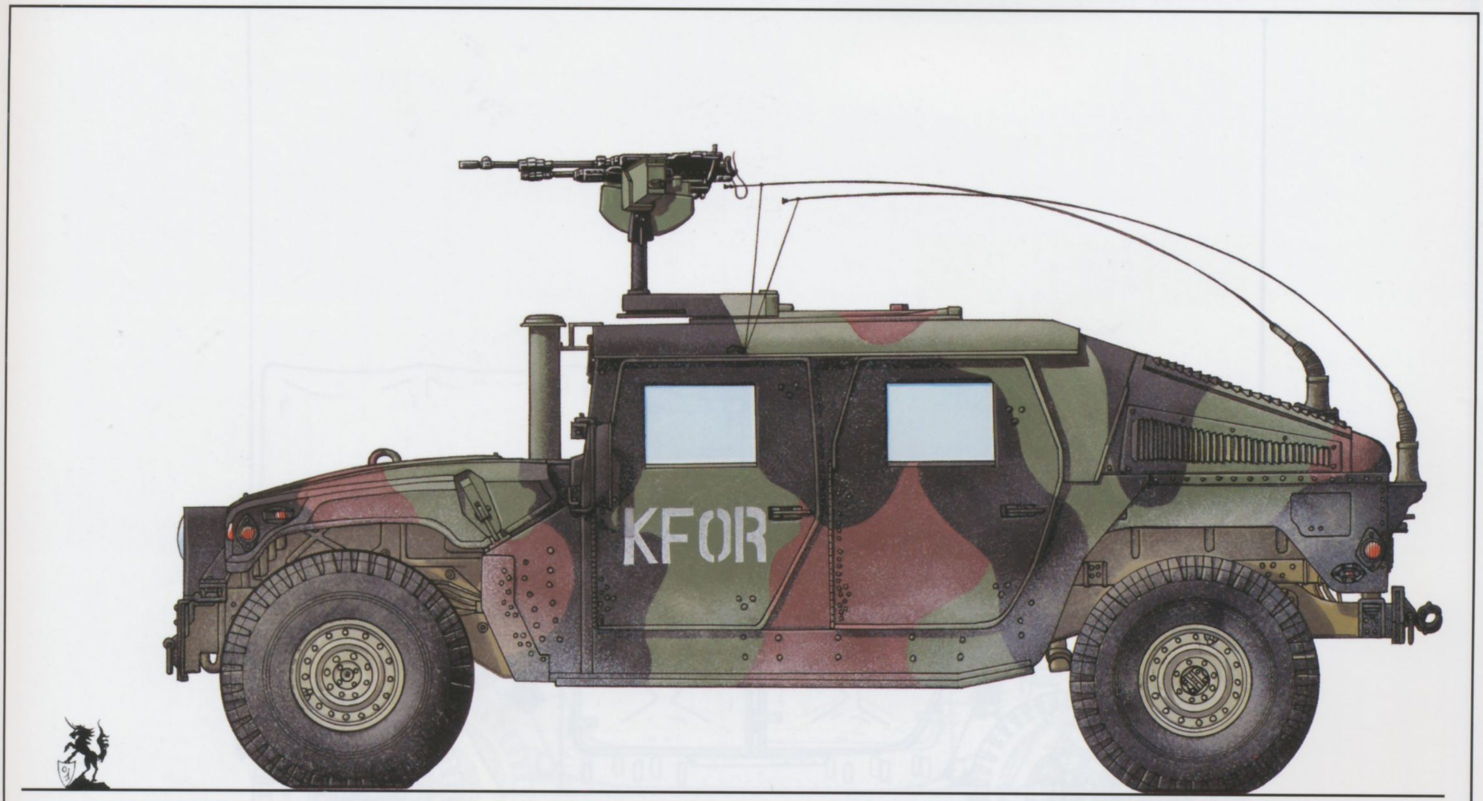
M998 Avenger, D Battery, 5th Battalion, 3rd Air Defense Artillery Regiment, Tuzlar, Bosnia, 1996

Avenger of D Battery, 5th Battalion, 3rd Air Defense Artillery Regiment of Task Force Eagle of IFOR, at Eagle Base in Tuzlar in September 1996. On the side doors of the vehicle the US Army's friend/foe identification system can be seen. The vehicle is painted in the three tone standard NATO camouflage pattern. In the US Army the following paint is used: FS 30051 Green, FS 34094 Brown and FS 37030 Black.



M1045 TOW Missile Carrier, 3rd Battalion, 8th Marines, KFOR, Gnjilane, Kosovo, 1999

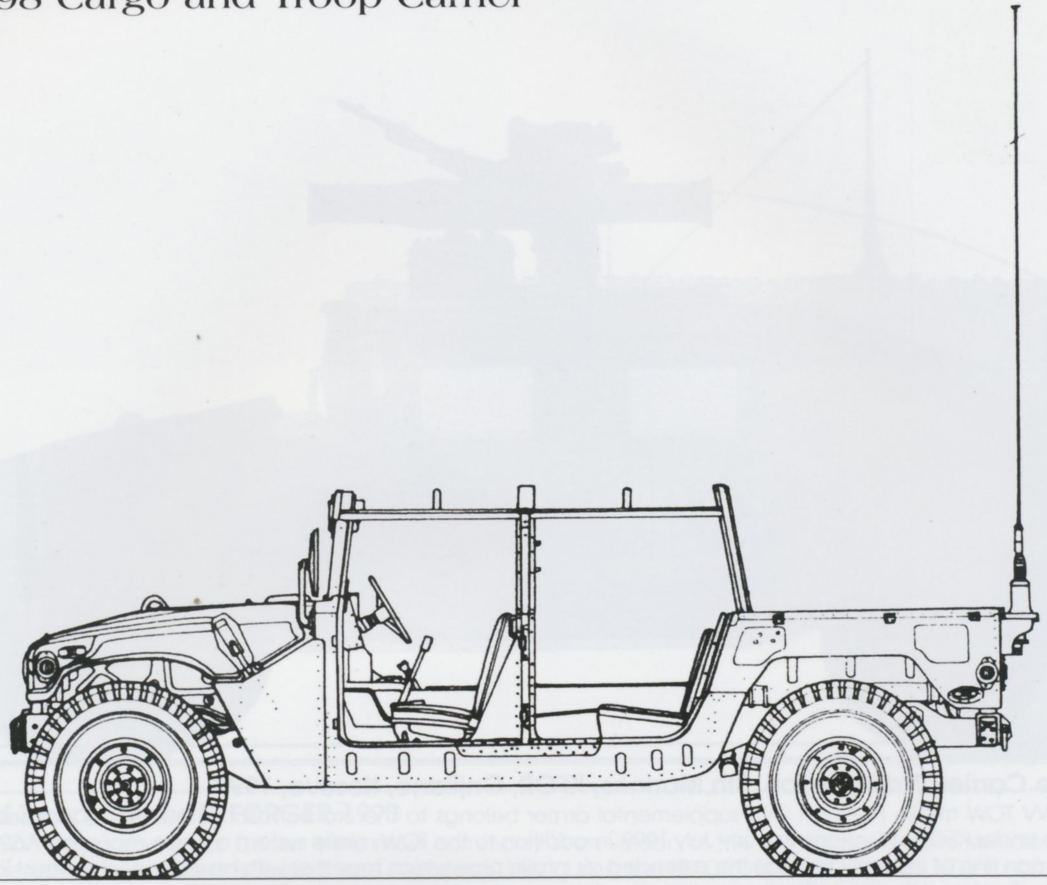
This M1045 HMMWV TOW missile platform with supplemental armor belongs to the 3rd Battalion, 8th Marines was seen during the unit's deployment to Kosovo under KFOR in Gnjilane in early July 1999. In addition to the TOW missile system a pintle-mounted 7.62mm M240 machine gun is fixed to the weapon ring of the vehicle. Note the extended air intake pipe which together with an extended exhaust improves the fording capacity of the vehicle. For friend/foe identification an orange cloth panel is draped over the bonnet. On a wooden board a role of barbed wire is carried on the bonnet of the vehicle, a common practice of US forces operating in a peace support scenario.

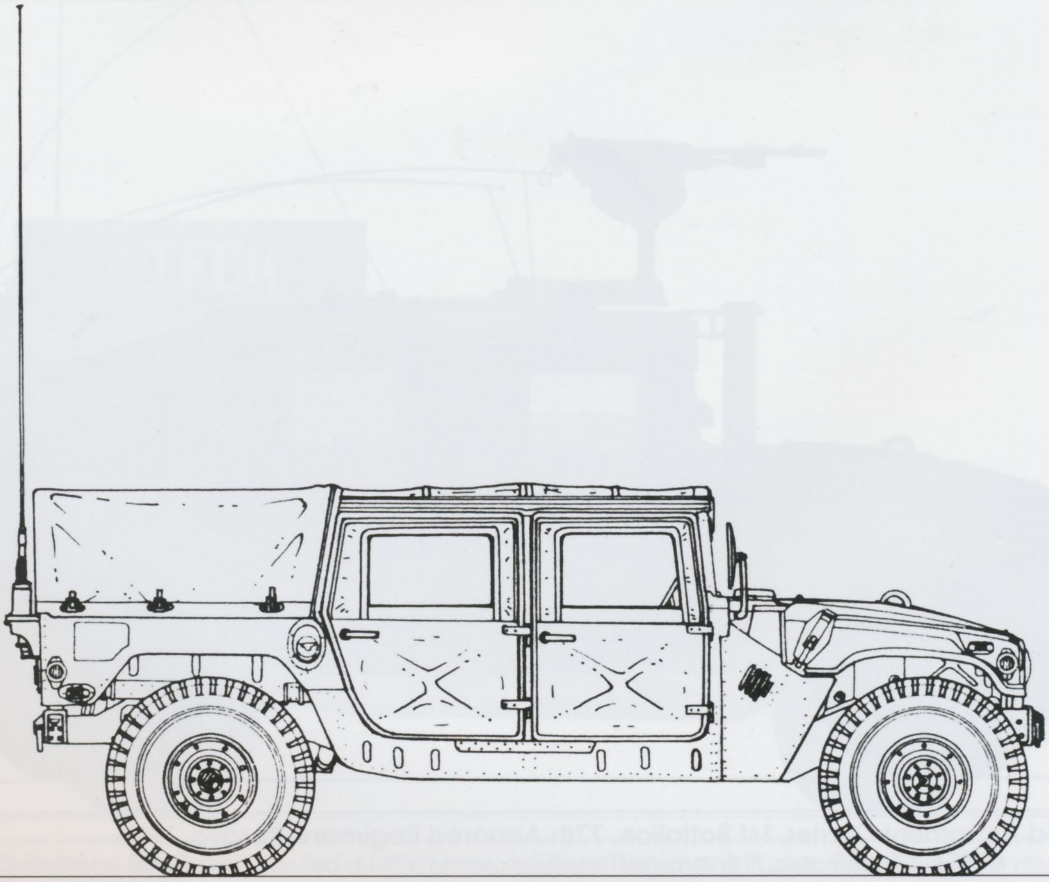


M1114 Up-armored Armament Carrier, 1st Battalion, 77th Armored Regiment, Kosovo, 1999

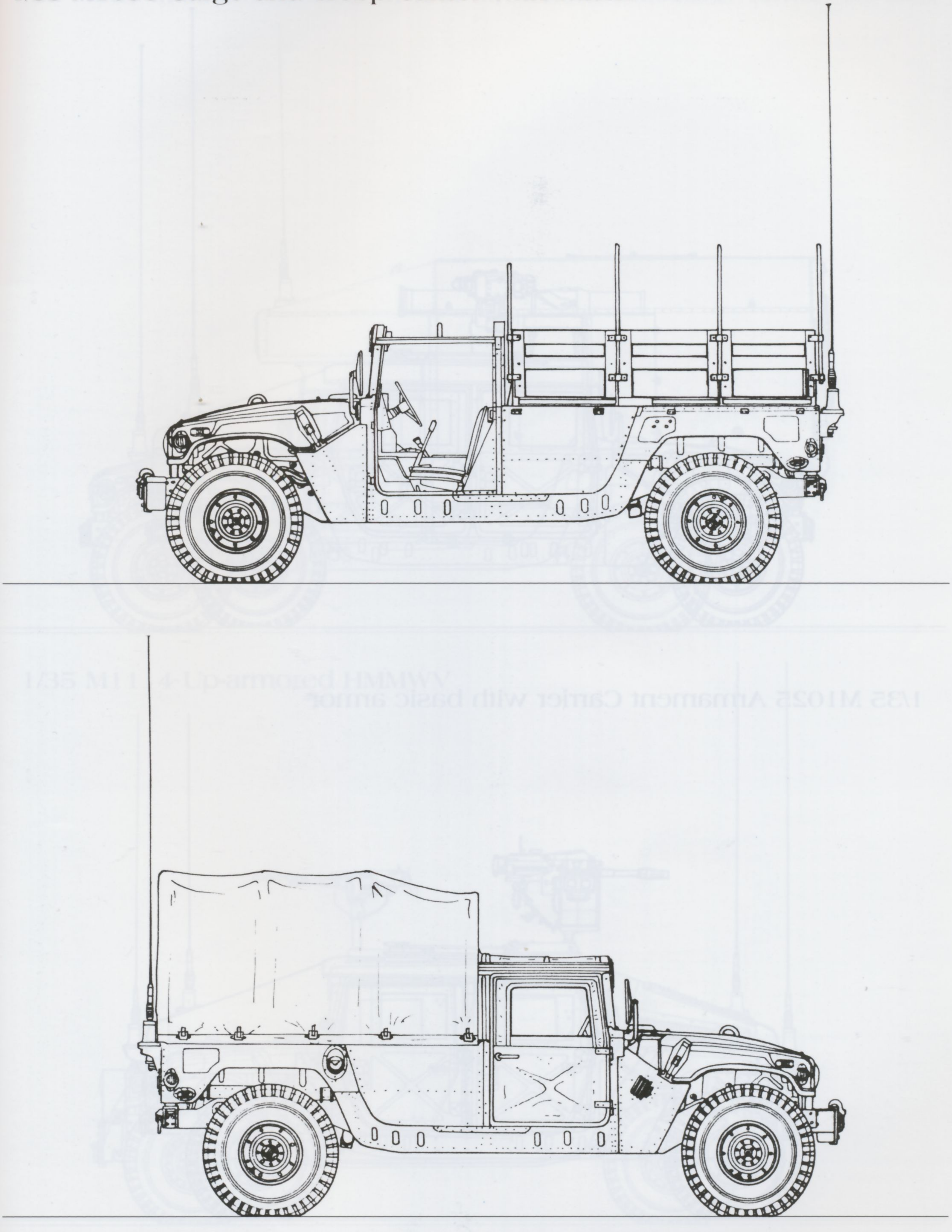
When deployed with KFOR the 1st Battalion, 77th Armored Regiment used M1114 Up-armored HMMWV in addition to their M1A1HA. This vehicle, which is armed with a 7.62mm M240 machine gun, was seen in Camp Bondsteel in Kosovo in October 1999. The M1114 Up-armoured HMMWV's armour protects the crew against the effects of 7.62mm small arms ammunition, 155mm splinters from overhead bursts and contact detonated anti-tank mines up to 12 lb.

1/35 M998 Cargo and Troop Carrier

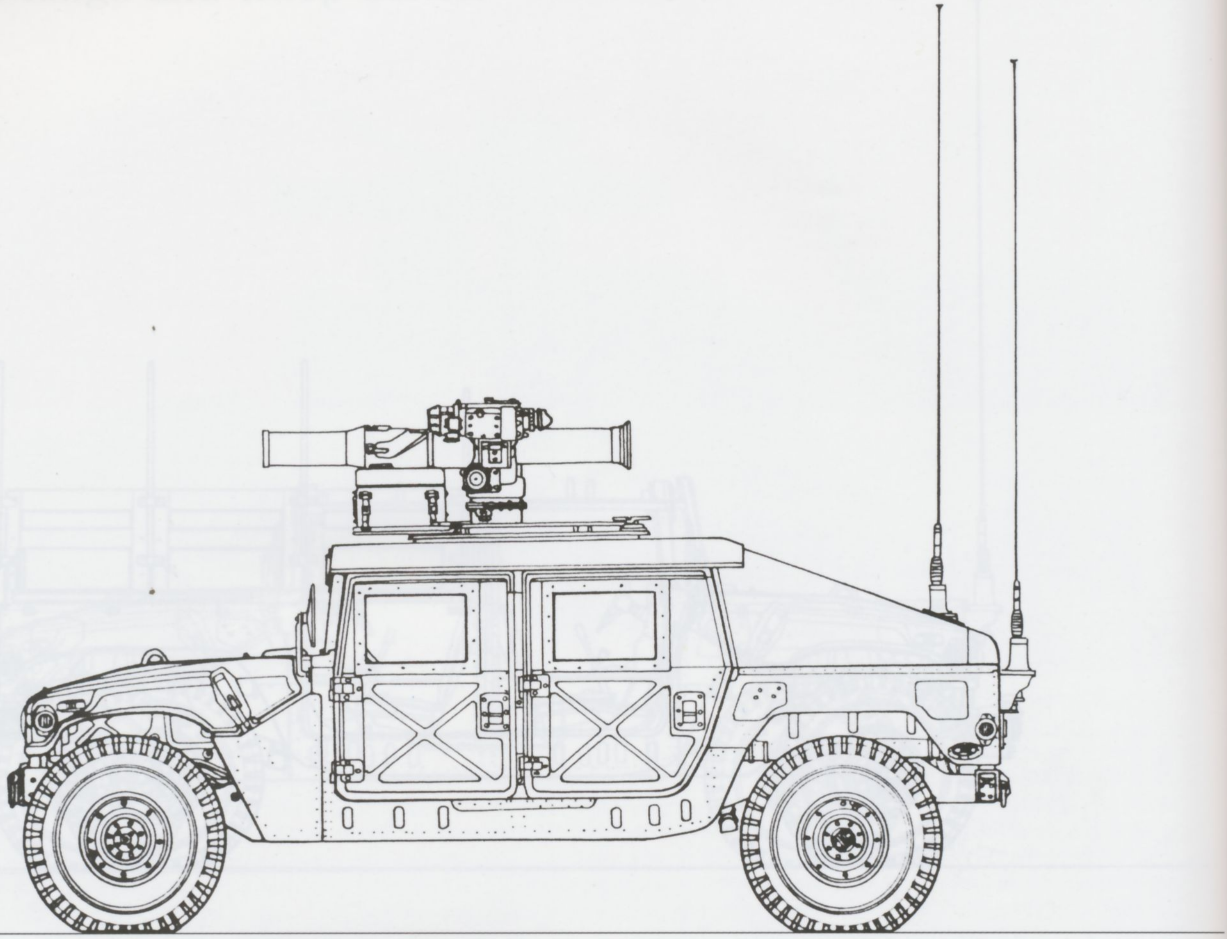




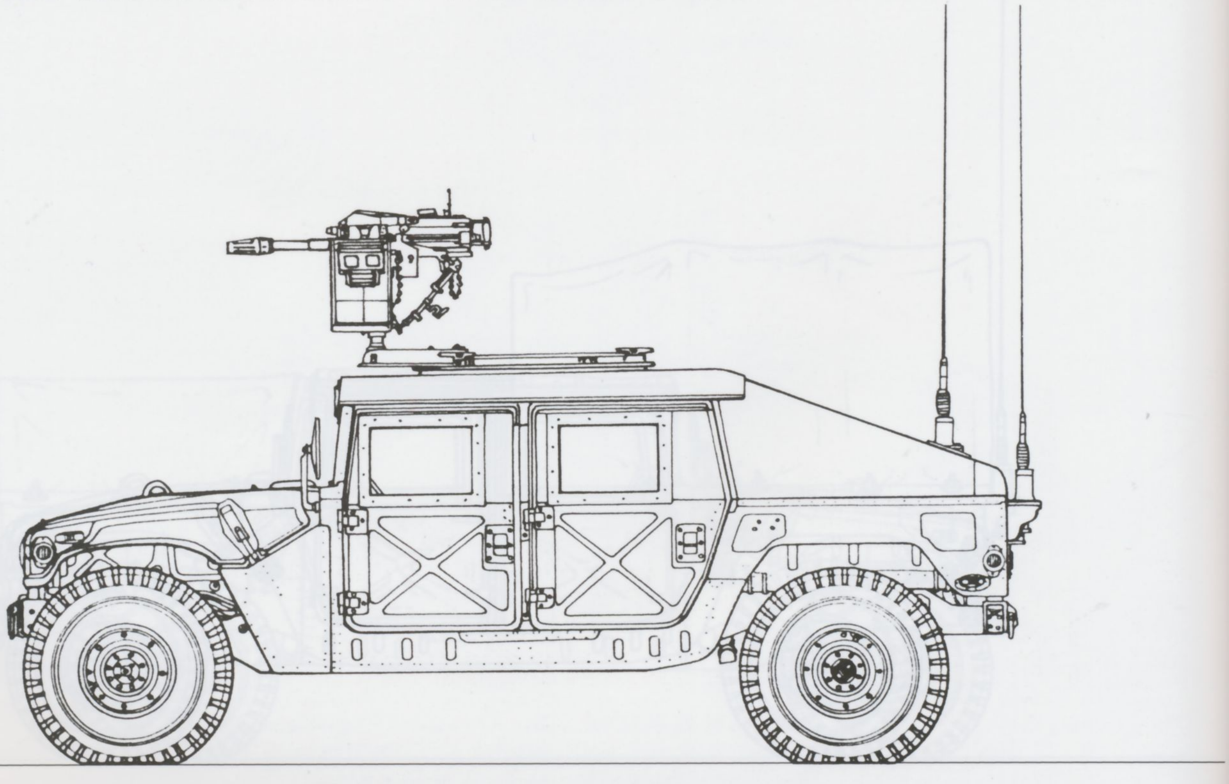
1/35 M1038 Cargo and Troop Carrier with winch



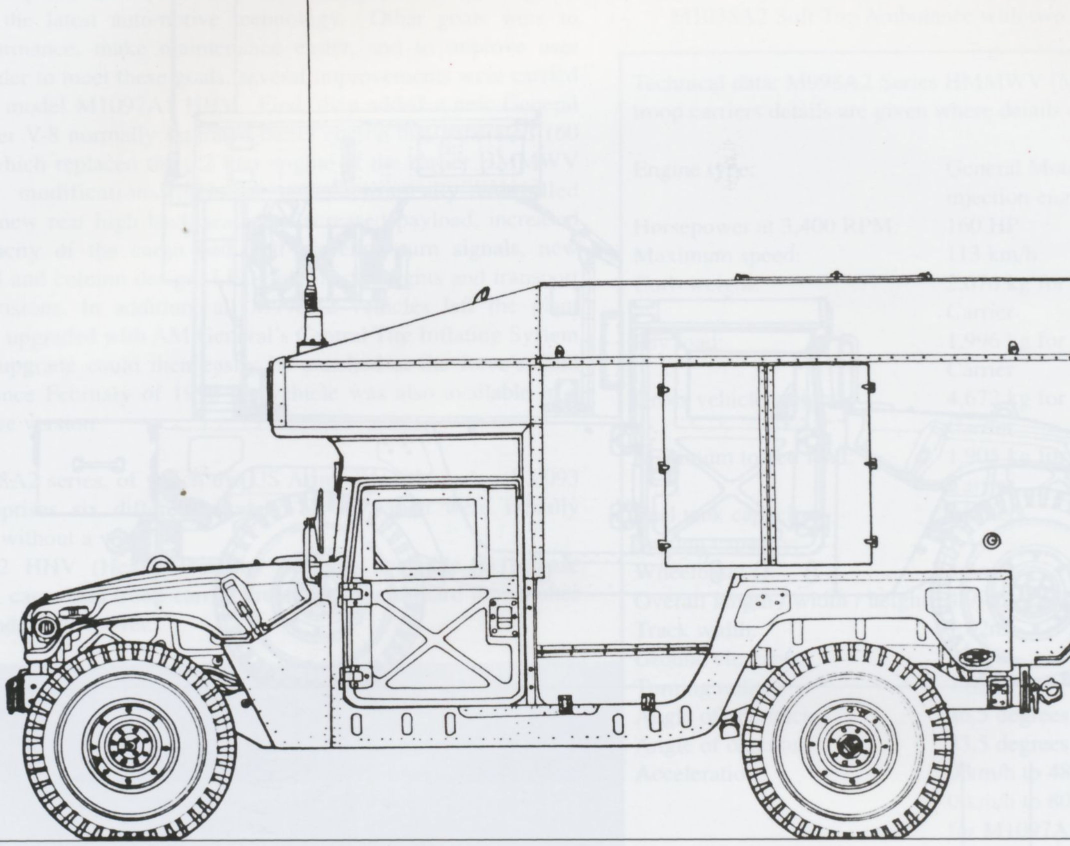
1/35 M966 TOW Missile Carrier with basic armor



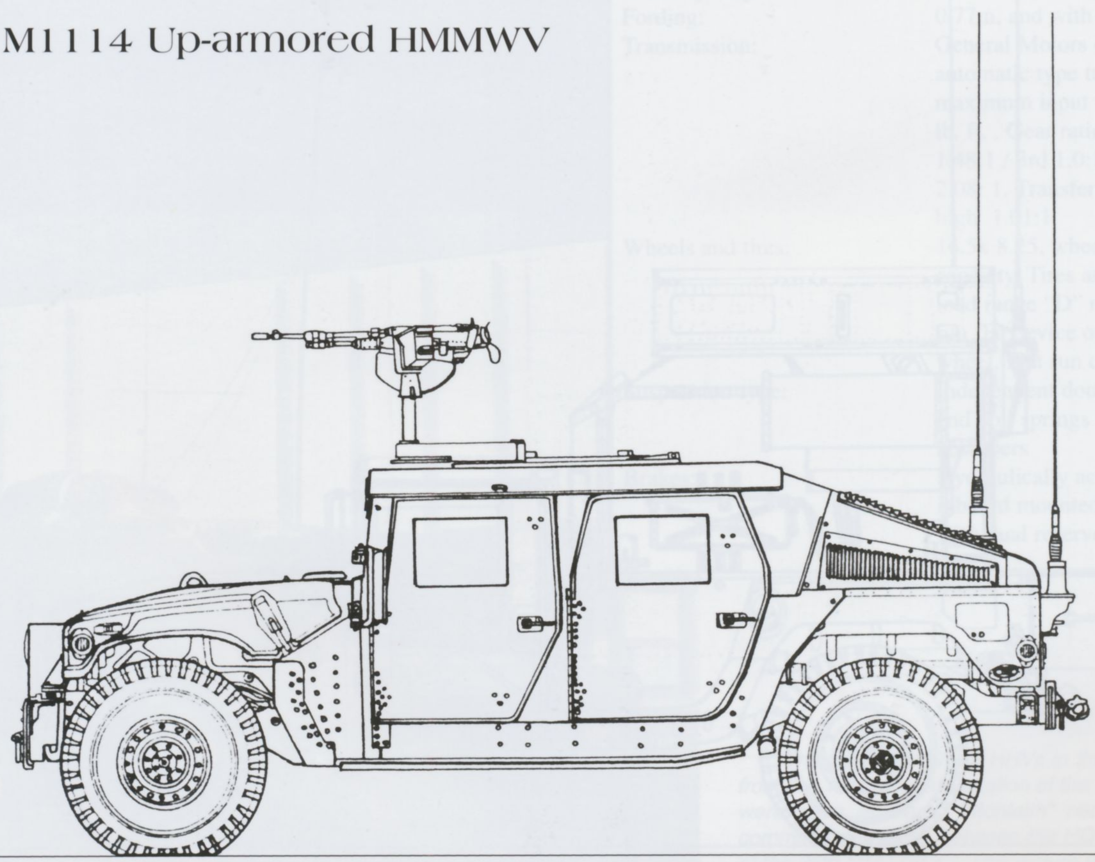
1/35 M1025 Armament Carrier with basic armor



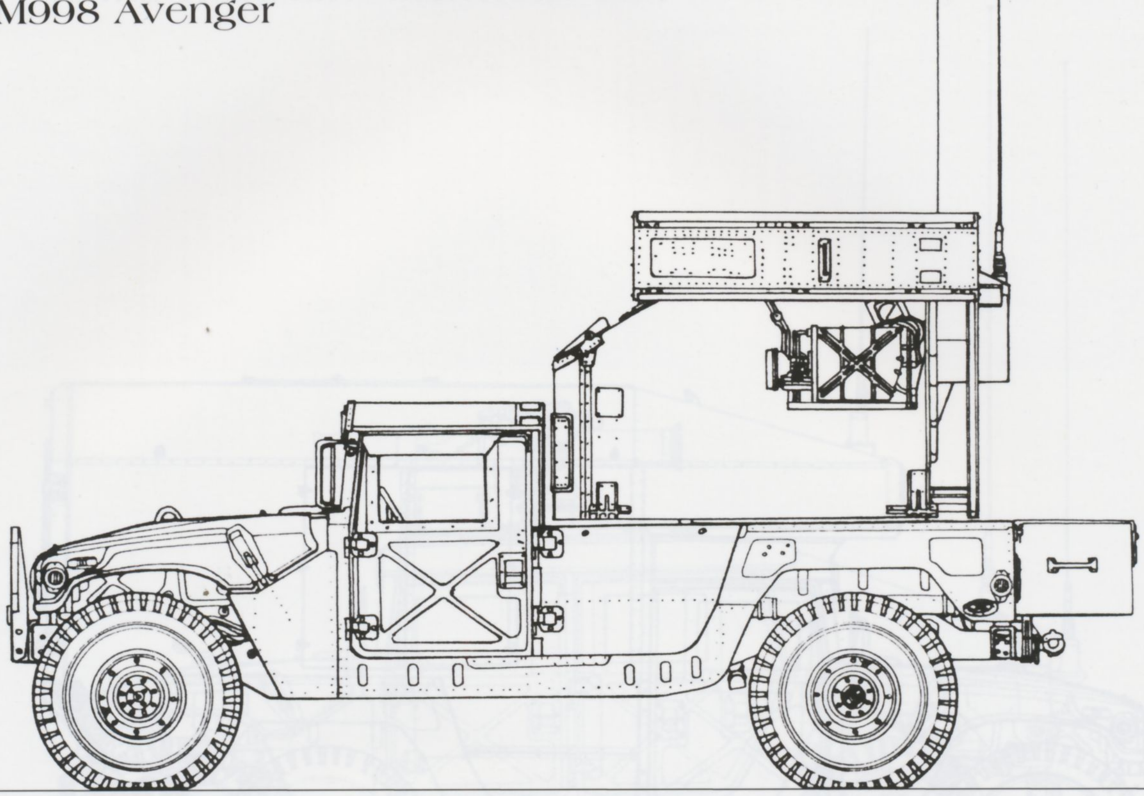
1/35 M997 Maxi-ambulance for four stretchers with basic armor

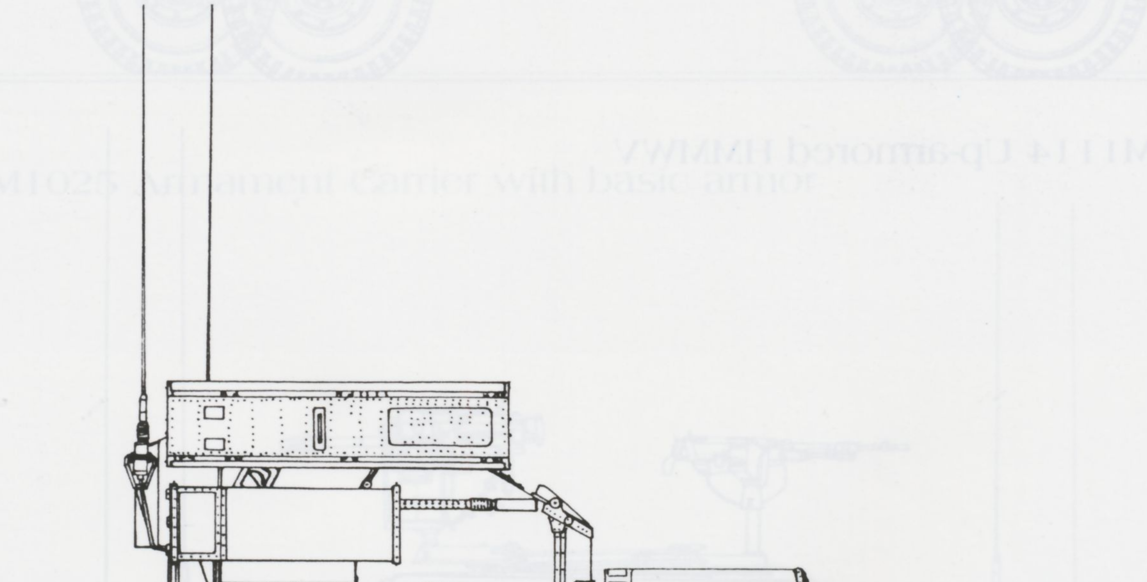


1/35 M1114 Up-armored HMMWV



1/35 M998 Avenger





The M998A2 HMMWV Series

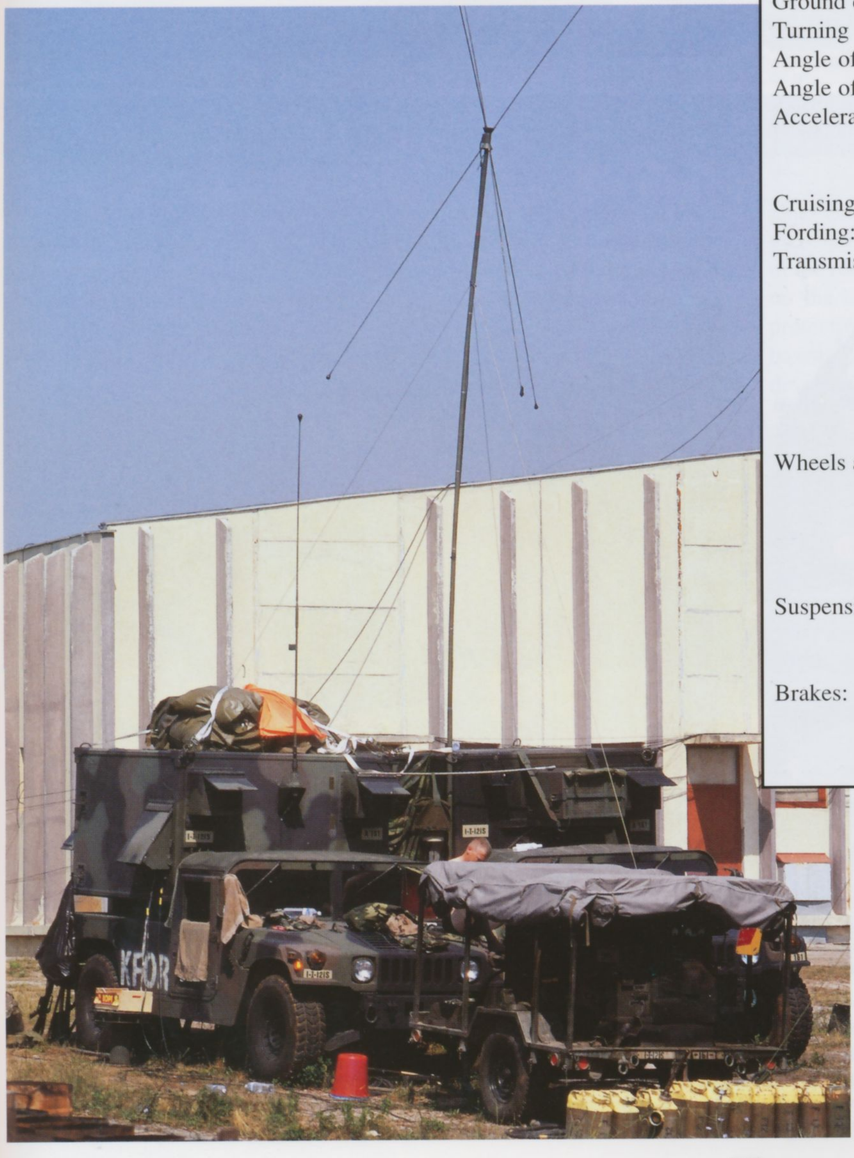
Development of the M998A2 Series began in 1993 and although some pre-production vehicles were made in mid-1995, full-scale production did not start until September of 1995. The purpose of the A2 Series was to improve the capabilities of the HMMWV vehicle range by incorporating the latest automotive technology. Other goals were to enhance performance, make maintenance easier, and to improve user comfort. In order to meet these goals, several improvements were carried out on a base model M1097A1 HHV. First, they added a new General Motors 6.5 liter V-8 normally aspirated diesel engine that generated 160 horsepower, which replaced the 6.2 liter engine of the earlier HMMWV series. Other modifications included an electronically controlled transmission, new rear high back seats, an increased payload, increased tie-down capacity of the cargo bed, self-canceling turn signals, new steering wheel and column design, LED side marker lights and transport tie-down provisions. In addition, all M998A2 vehicles left the plant prepared to be upgraded with AM General's Central Tire Inflating System (CTIS). This upgrade could then easily be attached at the force's field workshops. Since February of 1996 the vehicle was also available in a right hand drive version.

The M998A2 series, of which the US Army TACOM ordered 3,093 vehicles, comprises six different models, all of which were initially manufactured without a winch:

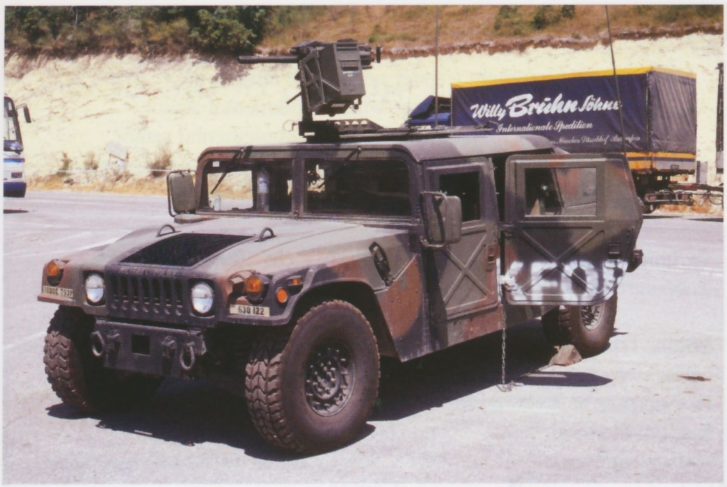
- M1097A2 HHV (Heavy Hummer Variant) available as a base platform, cargo and troop carrier are optional with hard top, shelter carrier and prime mover.
- M1025A2 Armament Carrier with basic armor
- M1043A2 Armament Carrier with supplemental armor
- M1045A2 TOW Missile Carrier with supplemental armor
- M997A2 Maxi-ambulance with four stretchers and basic armor
- M1035A2 Soft Top Ambulance with two stretchers

Technical data: M998A2 Series HMMWV (M 1097 A2 Cargo troop carriers details are given where details are configuration-bound)

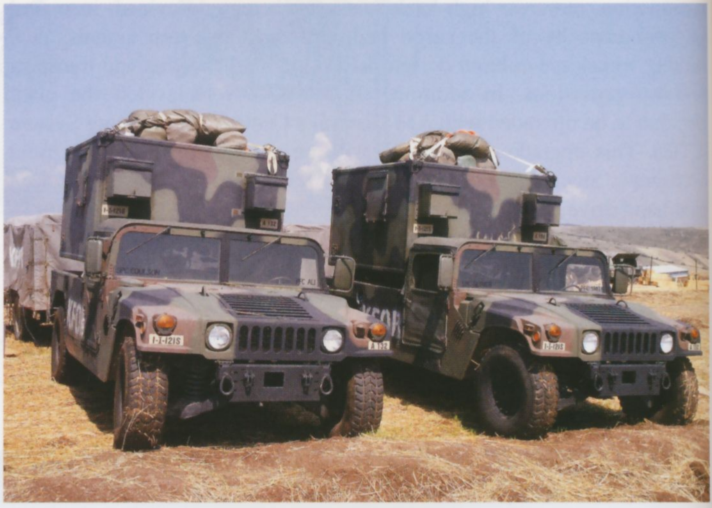
Engine type:	General Motors 6.5 liter V-8 diesel fuel injection engine, naturally aspirated.
Horsepower at 3,400 RPM:	160 HP
Maximum speed:	113 km/h
Curb weight:	2,676 kg for M1097A2 Cargo/Troop Carrier
Pay load:	1,996 kg for M1097A2 Cargo/Troop Carrier
Gross vehicle weight:	4,672 kg for M1097A2 Cargo/Troop Carrier
Maximum towed load:	1,905 kg for M1097A2 Cargo/Troop Carrier
Fuel tank capacity	94 liters
Seating capacity:	1 + 3
Wheelbase:	3.3m
Overall length / width / height:	4.99m /2.18m (mirrors folded) / 1.9m
Track width:	1.82m
Ground clearance:	0.39m
Turning radius:	7.62m
Angle of approach:	46.5 degrees
Angle of departure:	33.5 degrees
Acceleration:	0 km/h to 48 km/h in 9.4 seconds 0 km/h to 80 km/h in 26.1 seconds for M1097A2 Cargo/Troop Carrier
Cruising range:	443 km for M1097A2
Fording:	0.77m, and with extra kit 1.52m
Transmission:	General Motors 4L 80E 4- speed automatic type transmission with a maximum input torque rating of 451 lb. ft. . Gear ratios 1st 2.48:1 / 2nd 1.48:1 / 3rd 1.0:1 / 4th 0.75:1 / reverse 2.08: 1. Transfer case low 2.72: 1 and high 1.01:1
Wheels and tires:	16.5x 8.25, wheel with 1747kg capacity. Tires are 37x 12.5 R 16.5 LT load range "D" radial with low profile run flat device on two piece take apart wheel. Flat run capability is 48 km
Suspension type:	Independent double A frame with open end coil springs and hydraulic shock absorbers
Brakes:	Hydraulically actuated, four wheel inboard mounted power disc brakes with dual reservoir master cylinder.



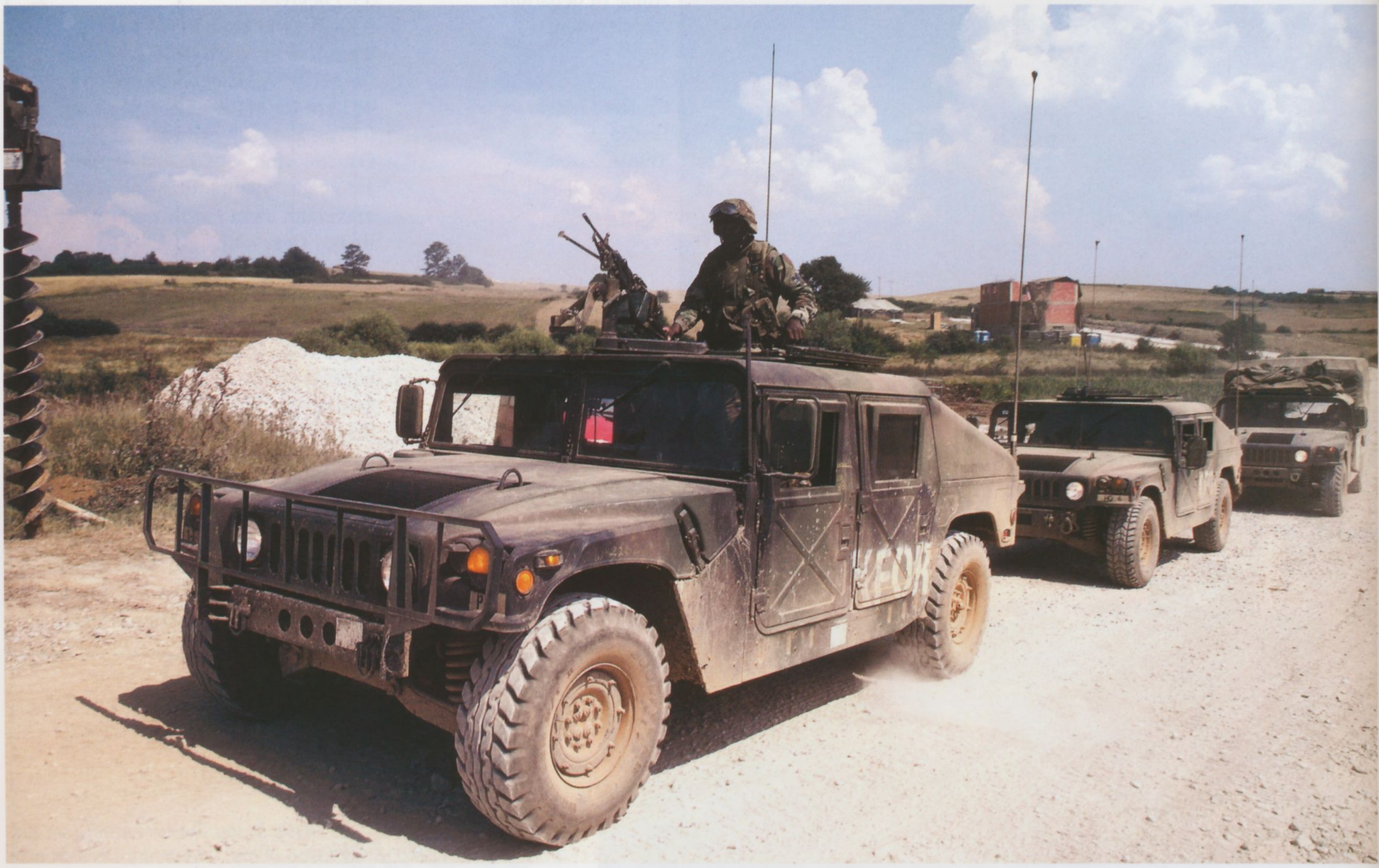
These two M1097A2 HHVs in the shelter carrier role are from the 121st Signal Battalion of the 1st Infantry Division and were seen at Camp "Monteith" near Gnjilane providing a communications link between the HQ of MNB(E) and the HQ of the 26th MEU (SOC). This picture was taken in early July of 1999, just three weeks after KFOR entered Kosovo and the Serb forces had withdrawn.



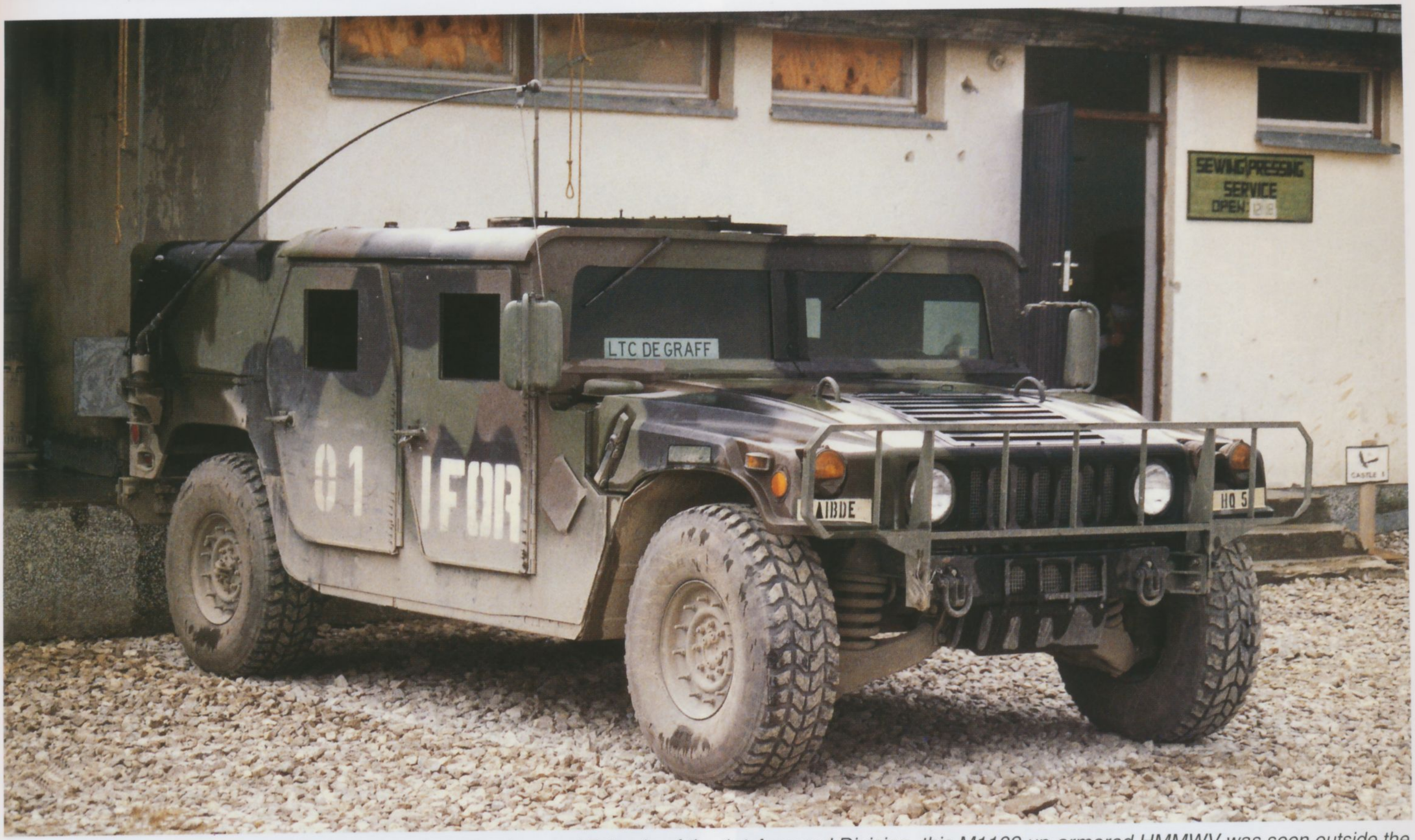
Belonging to the 793rd Military Police Battalion of the 18th Military Police Brigade, this M1025A2 armament carrier with basic armor was seen at the Kacanik Pass boarder crossing in March of 2000. On the weapons ring a 40mm Mk.19 automatic grenade launcher is mounted. The best way to identify vehicles of the M998A2 HMMWV Series is by the bumper plate. They have a rectangular hole in which a winch can be mounted. Another characteristic is the low positioned truck type mirrors. However, the chassis, hard top, doors and so on remain nearly unchanged, making its appearance nearly identical to that of the M998 and M998A1 series.



This pair of M1097A2 HHVs in the shelter carrier role are from the 121st Signal Battalion of the 1st Infantry Division. They were seen in support of the 26th MEU of the USMC in Kosovo in July 1999. Both vehicles have hard tops but are outfitted with different doors. The vehicle on the left has doors made of basic armor, identified by their X shaped pattern. In contrast, the vehicle on the right has soft top doors which are made out of soft plastic and mounted on a metal frame. Note that the names of the crew are displayed on the lower part of the windshield, which is common practice among US forces.

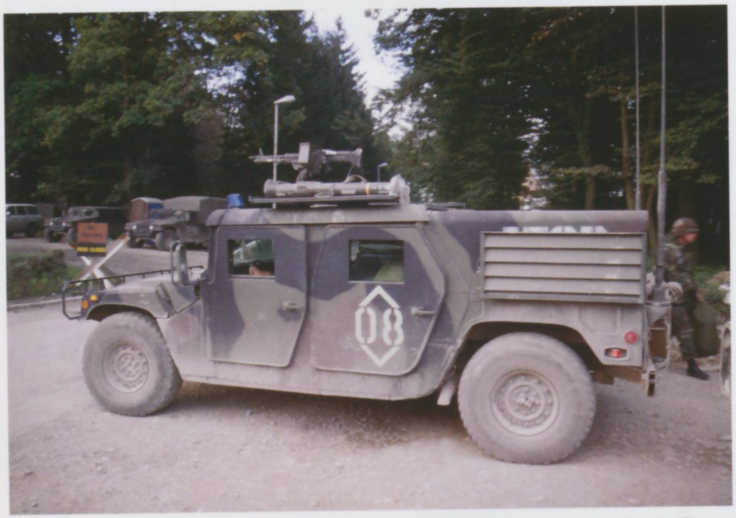


Belonging to the 1st Infantry Division, this convoy was seen starting a patrol from Camp "Bond Steel" in March 2000. Leading this convoy is an M1025 armament carrier with basic armor. The second vehicle can be identified as an M025A2 armament carrier with basic armor followed by an M988 cargo and troop carrier with two door soft top enclosure and high tilt. Note that the truck type mirrors of the M1025A2 vehicles are much lower on the windshield frame than that of the upgraded M998 Series. HMMWVs of the M998A2 series are seldom seen in huge numbers as they are typically used to replace worn out older variants. It is much more common to see them operating with other HMMWV variants.

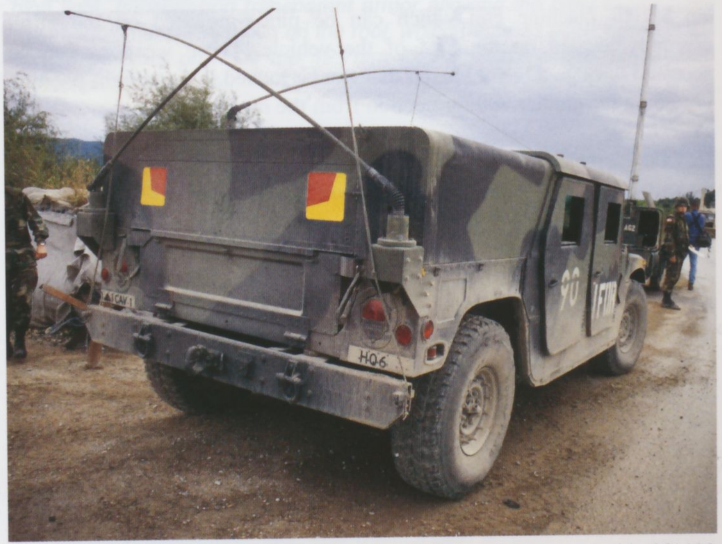


Belonging to the HQ and HQ Company of the 1st Armored Brigade of the 1st Armored Division, this M1109 up-armored HMMWV was seen outside the unit's compound. The compound is in fact an old school building, which had been used in the past as a HQ by the Bosnian Croatian Army in March of 1996. Note the brush guard that was fitted to all vehicles of this version in Bosnia. Later during the Kosovo deployment of the US Army these guards were absent.

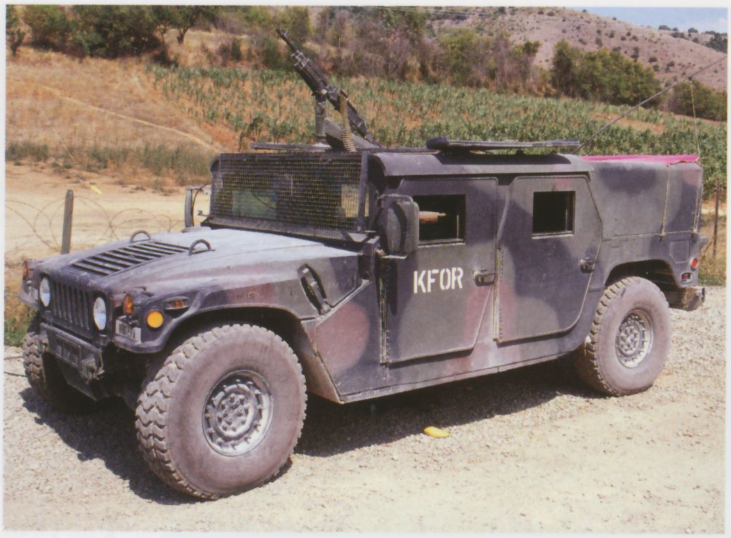
The M1114 Up-armored HMMWV is also known as the "Heavy HMMWV". O'Gara - Hess & Eisenhard in Fairfield, Ohio, manufacture the armor for the vehicle. It can protect the crew against 7.62mm small arms ammunition, 155mm splinters from overhead bursts and even contact detonated anti tank mines up to 12 lbs. All four doors are fully armored with 7.62mm AP perimeter protection at a 100m standoff. They also feature operable windows with high light, transmission transparent armor glass commonly referred to as "white glass". This same glass is used for the windshield assembly to which a de-ice system can be fitted. The armor of the roof assembly is mounted on shock absorbing bushings and is rolled on the edges to overlap the perimeter armor, providing the crew with protection from all possible angles. The M1114 Up-armored HMMWV is based on the M1113 Expanded Capacity Vehicle (ECV) HMMWV. It was developed by AM General under contract to the US Army in order to



Used by the US Military Police, this M1109 was seen at Eagle Base near Tuzla in the summer of 1996. While nowadays the US Army uses the M240 machine gun, at that time the M60E3 was the standard and can be seen here fitted to the weapons ring. On the left part of the two part roof hatch an AT-4 light anti-tank weapon can also be seen. Like their unarmored colleagues, the M1109s were used for patrolling, escorting convoys, liaison services, troop transport, traffic control operations, reconnaissance and for gathering intelligence.



Deployed with the 1st Squadron, 1st Cavalry Regiment, this M1109 was seen at Checkpoint Alpha 2 in Bosnia during the summer of 1996. The right bumper code and three antennas mounted on the vehicle identify it as belonging to the HQ of the unit. Several M1109s were seen in Bosnia during this period. It is estimated that the bulk of the US Army's fleet was deployed to protect troops against the huge mine threat and against possible aggression from the former warring fractions.

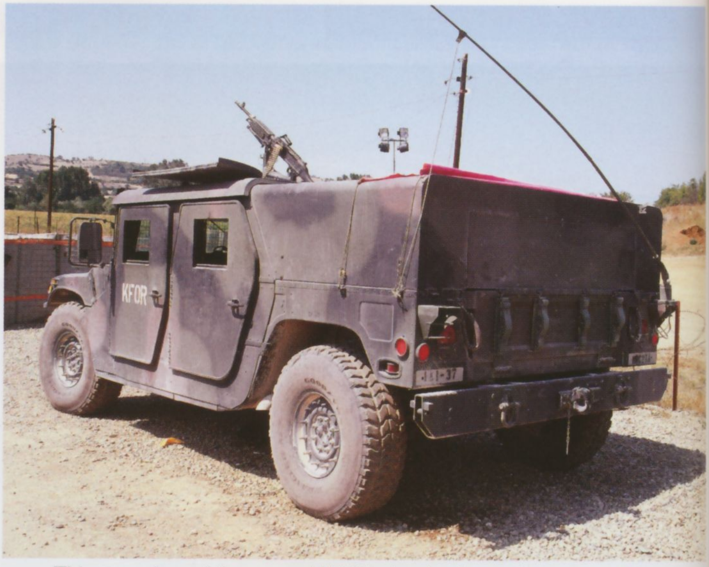


This M1109 of the 1st Battalion, 37th Armored Regiment was seen close to Domorovce in Kosovo near the boundary to Serbia in July 2000. The deployment of M1109 to Kosovo was the latest in a series where the vehicles were used to limit casualties during high risk operations. The M1109 has seen service in Haiti, Somalia and Bosnia. In this particular situation US soldiers were manning a VCP together with Russian paratroopers. At this time, tensions were rising between the Albanians and Serbs in the Presevo valley.

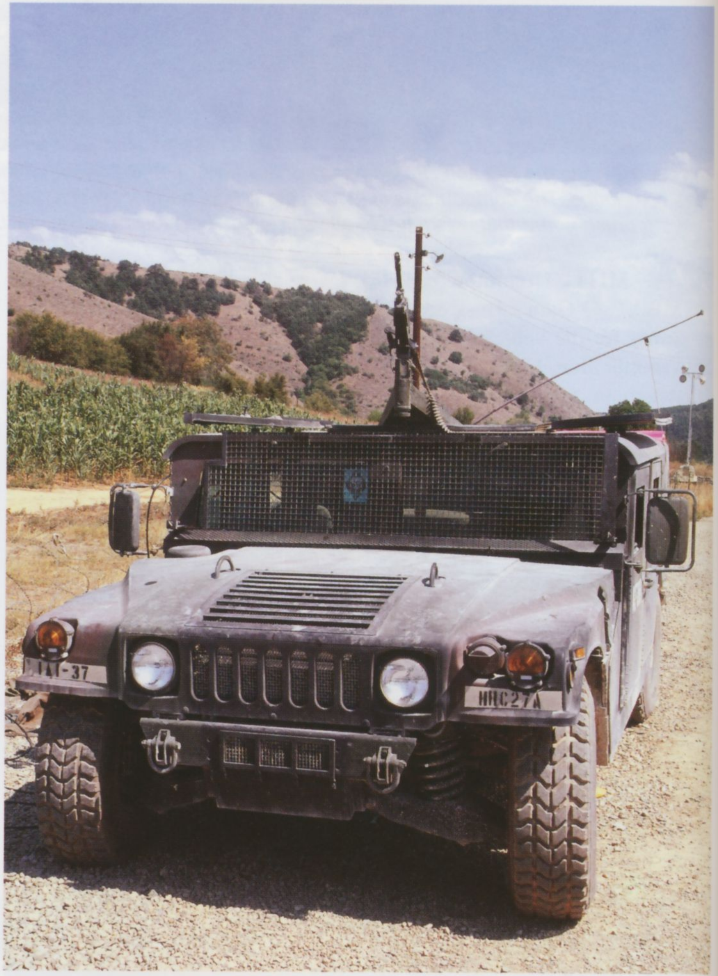
provide a vehicle with a greater payload. This was necessary to allow for the heavier armor packages and shelter. To meet the US Forces requirements in performance and mobility, a new turbo diesel engine was installed into the M1113 (ECV) and the HMMWV frame was reinforced. Other modifications included redesigned differentials, improved half-shafts, a new exhaust system, an improved suspension system, a modified steering system and upgraded wheels. The modification was completed by adding waterproof dual batteries, three point seat belts, high back bucket seats with shock absorbing capability, a large cargo shell door which opens in two directions, a specially designed fuel filter cover preventing unauthorized access, a Central Tire Inflation System and a heavy duty air conditioning system. Optionally the M1114 Up-armored HMMWV can also be fitted with a winch.

For US forces the M1114 Up-armored HMMWV will widely replace the M1025 models as an armament carrier. It can use a wide range of weapons such as the Mk.19 40mm automatic grenade launcher or the .50 cal M2HB machine gun which can be pintle-mounted on the turret assembly located on the roof of the vehicle. These weapons can be accessed through a bi-fold hatch that can be locked in an upright position providing the gunner with protection from the rear.

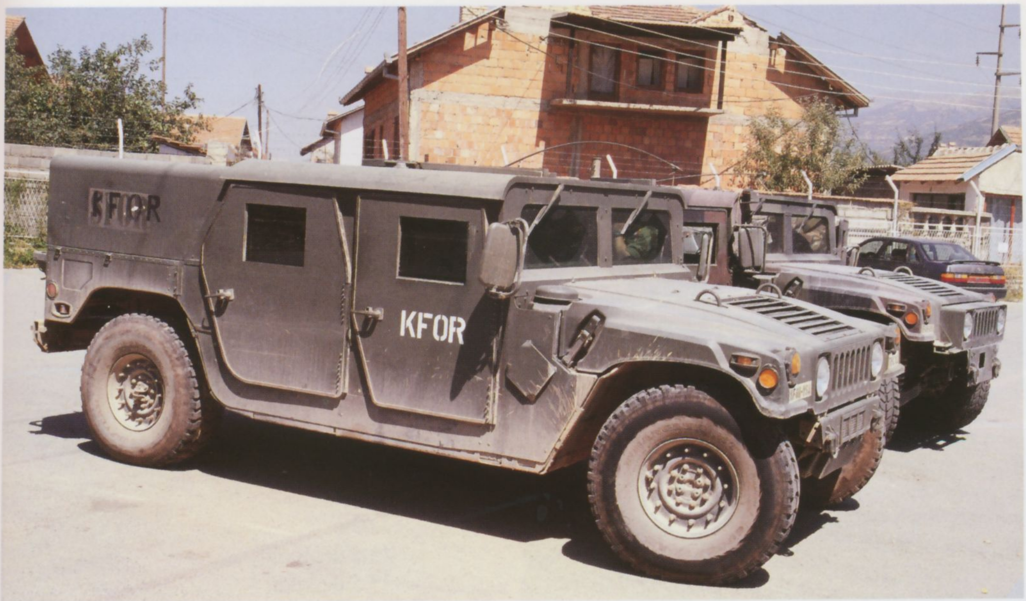
Development of the M1114 Up-armored HMMWV began in 1993 under the name of the XM1109 and was based on the M1097A1. After intensive trials of XM1109 prototypes, a total of 159 M1109s were built for the US Army. These vehicles first saw service in Haiti, Somalia, Bosnia and Kosovo. The XM1109 was further enhanced after the US Army awarded a contract to develop an improved version to O'Gara - Hess & Eisenhard in May of 1994. The first prototype called the XM1114 was completed in September of 1995. It was then tested, renamed the M1114, and production started in early 1996. The initial order was for 1,062 vehicles in 1998 and orders for a subsequent 738 M1114 Up-armored HMMWVs followed. By this time the vehicle was in use with both the US Army and Air Force. In May of 1998, the 1,000th M1114 left the O'Gara - Hess & Eisenhard production plant and was delivered to US forces. In June 2000 O'Gara - Hess & Eisenhard was awarded a five year contact by the US Army for further production of M1114s. Other users of the M1114 include the Luxembourg Army, who ordered 24 vehicles in 1996; Qatar, who ordered eight vehicles; as well as the Slovenian Armed Forces. From the M1114 came the M1116 which is available with five different armor kits. It was specially designed for the US Air Force, which received 71 out of a total of 449 vehicles ordered after February of 1998.



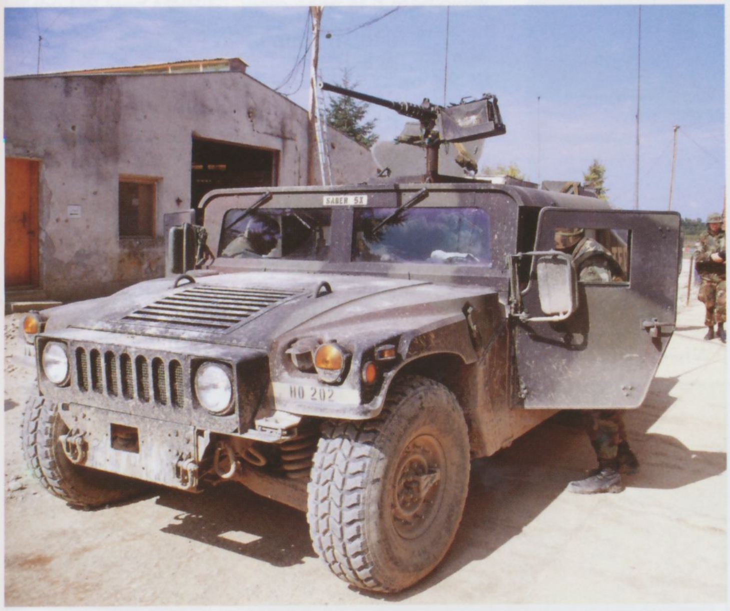
This rear view of the same M1109 clearly shows the armored hard top. The armor package includes under body blast protection, windscreen armor, perimeter armor, transparent armor and 360° overhead protection. The M1109 specifications include the 7.62mm armor piercing perimeter, 155mm Airburst overhead protection and 12-lb. front under body blast and 4-lb. rear under body blast protection. On the roof mounted weapons ring a 7.62mm M240 machine gun can be seen.



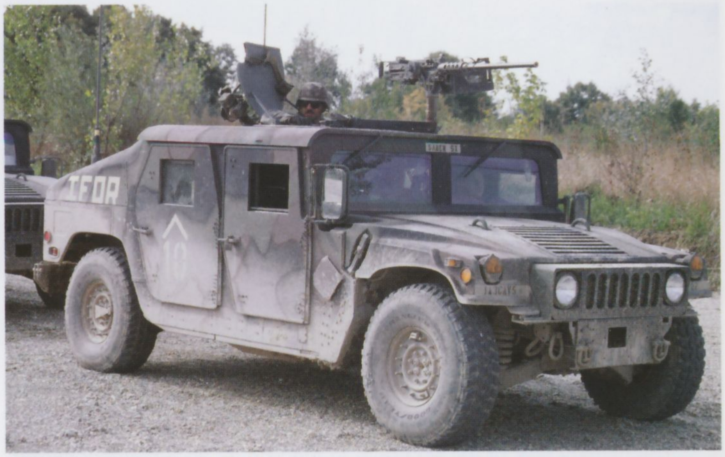
This front view of an M1109 from the 1st Battalion, 37th Armored Regiment shows the omission of the extended nose. This later became a significantly recognizable feature of this series. This vehicle is rarely seen today as only a small number were produced. It has a maximum speed of 113 km/h, a gross vehicle weight of 10,000 lbs and according to the manufacturer can accelerate from 0 to 48 km/h in 6.96 seconds. Note the opened two part hatch on the roof of the vehicle and the field-added lattice in front of the windscreen, installed in order to prevent stones from damaging the bulletproof glass.



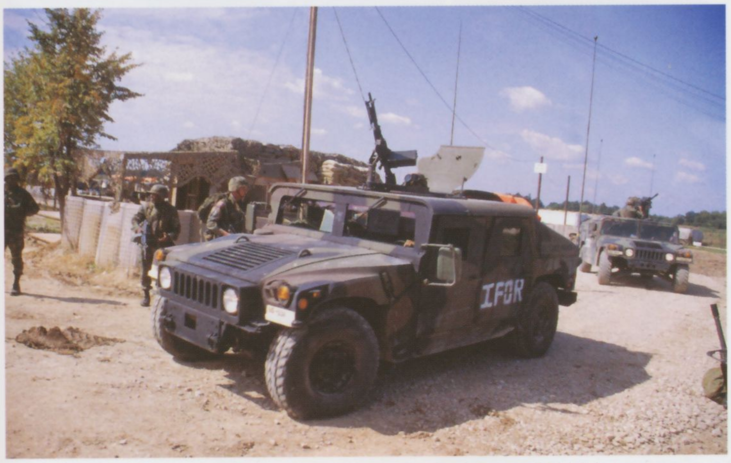
While the M1109 is based on the M1097A1 HHV, the M1114 is based on the M1113 Expanded Capacity Vehicle (ECV). The best way to tell the difference is from its distinctive nose. In this picture the olive green vehicle in the front is an M1109 while behind it, identified by its distinctive nose, an M1114 up-armored HMMWV can be seen. Note that the first vehicle has seen action with SFOR before it was deployed to Kosovo, as the SFOR letters are still visible under the KFOR markings. This picture was taken near the HQ of the German led MNB(S) in Prizren in July of 2000.



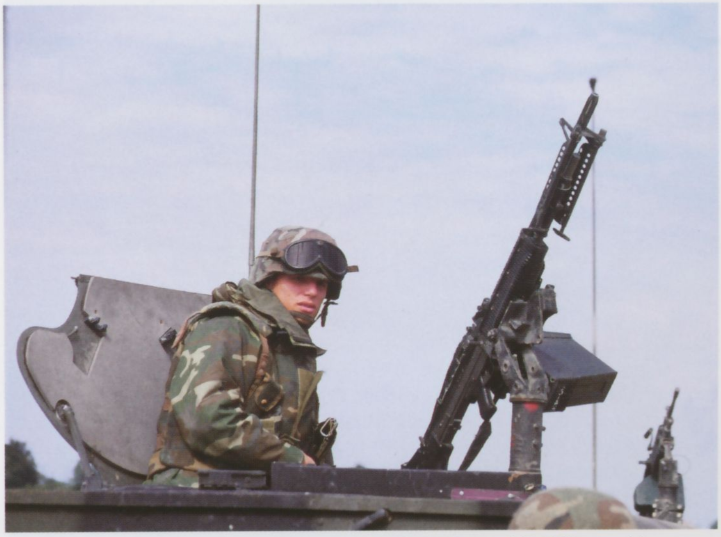
This M1114 is fitted with a pintle-mounted 12.7mm M2HB machine gun and belongs to the Saber Scout Platoon, 3rd Squadron, 5th Cavalry Regiment "Black Knights". It was seen during the summer of 1996 at Camp McGovern near Brcko.



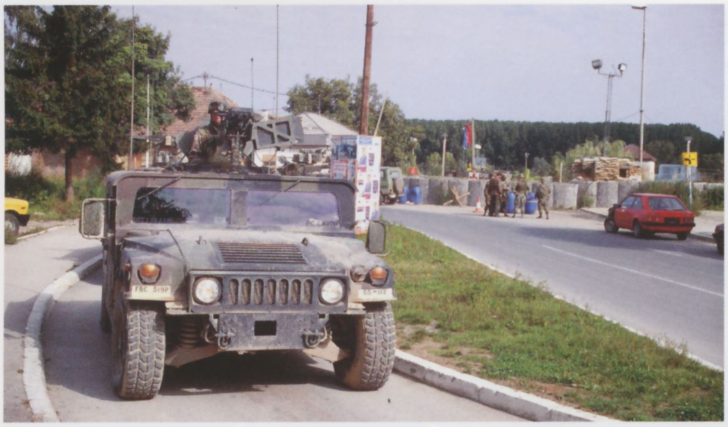
Another picture of the same M1114 from the Saber Scout Platoon, 3rd Squadron, 5th Cavalry Regiment. This time it was seen near the destroyed railway bridge in Brcko during the summer of 1996. It well illustrates that the armor in the roof assembly of the M1114 is rolled on the edges to overlap the perimeter armor. All four doors are fully armored with 7.62mm AP perimeter protection and the windshield and windows are made out of the high light, transmission transparent armor allowing the crew to use night vision equipment. The hatch on the roof, which here has been locked in the upright position, provides the 12.7mm M2HB machine gun gunner with protection from the rear.



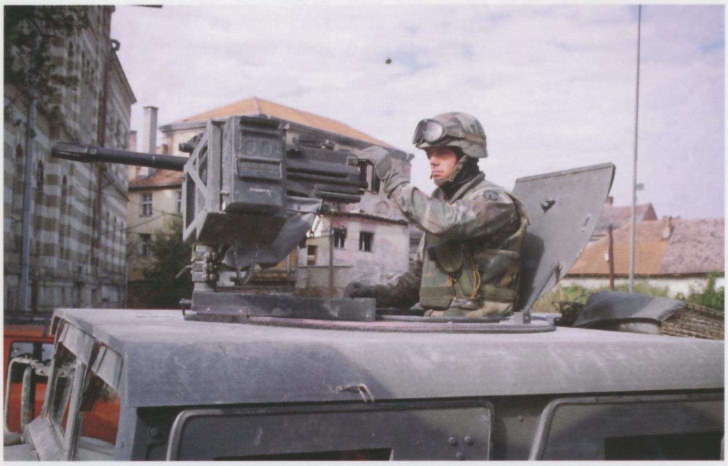
Leaving Camp McGovern for a patrol mission, an M1114 can be seen leading a column of HMMWV armament carriers. The 65th Military Police Company (Airborne) of the 519th Military Police Battalion was the only unit that received the then new vehicle in exchange for their M998A1 armament carriers. Although the vehicle is apparently able to handle a winch, the author has not seen an M1114 in this configuration.



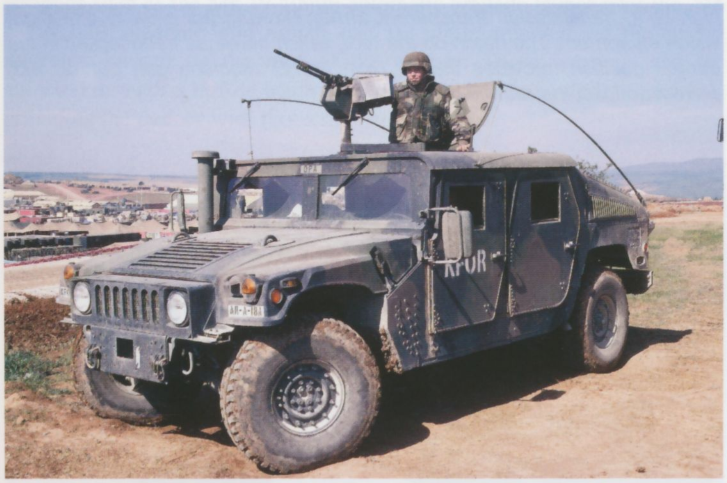
This shot shows a pintle-mounted 7.62mm M60E3 machine gun mounted on an M1114, which was seen in Bosnia during the summer of 1996. Note the large hatch which protects the machine gunner to his rear.



This patrol of HMMWV armament carriers from the 65th Military Police Company (Airborne), 519th Military Police Battalion is led by an M1114 armed with a 40mm Mk.19 automatic grenade launcher. The vehicles were seen in the center of the Serb town of Brcko. In the rear, the entrance to the IFOR held bridge over the Save which links Bosnia with Croatia is seen. This picture was taken during the summer of 1996.



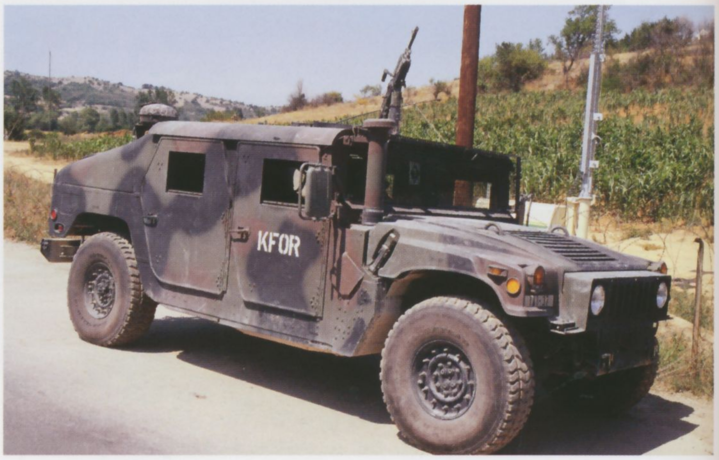
The primary task of the M1114 is to function as an armament carrier. As a result, its roof mounted weapons ring can be outfitted with any weapon previously mounted on any HMMWV armament carrier. Pictured here, a 40mm Mk.19 automatic grenade launcher is mounted on an M1114 from the 65th Military Police Company (Airborne) during a security operation in Brcko.



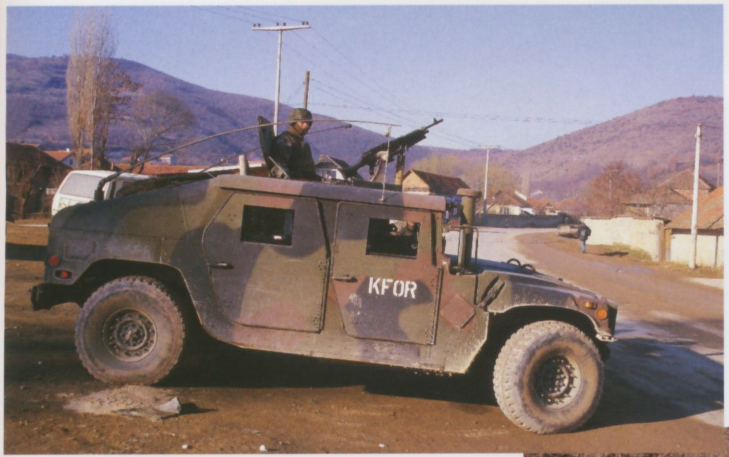
Used by the 1st Battalion, 77th Armored Regiment, this M1114 was seen at Camp Bond Steel in October of 1999. In an attempt to minimize unnecessary movement of heavy armor such as the M1A1HA MBT, US armored units were equipped with M1114s for daily patrolling purposes. This allowed them to deal with problems such as traffic accidents and the difficulty of moving around due to the destruction of Kosovo's already fragile road system. At the rear of the vehicle the air intake for the heavy-duty air conditioning system can be seen. However, even with dual air blowers that circulate the air in all areas of the crew compartment, the hot Balkan sun can still make it uncomfortably hot inside the cab.

Technical data: M1114 Up-armored HMMWV (Technical Data for M1113 ECV HMMWV is in brackets)

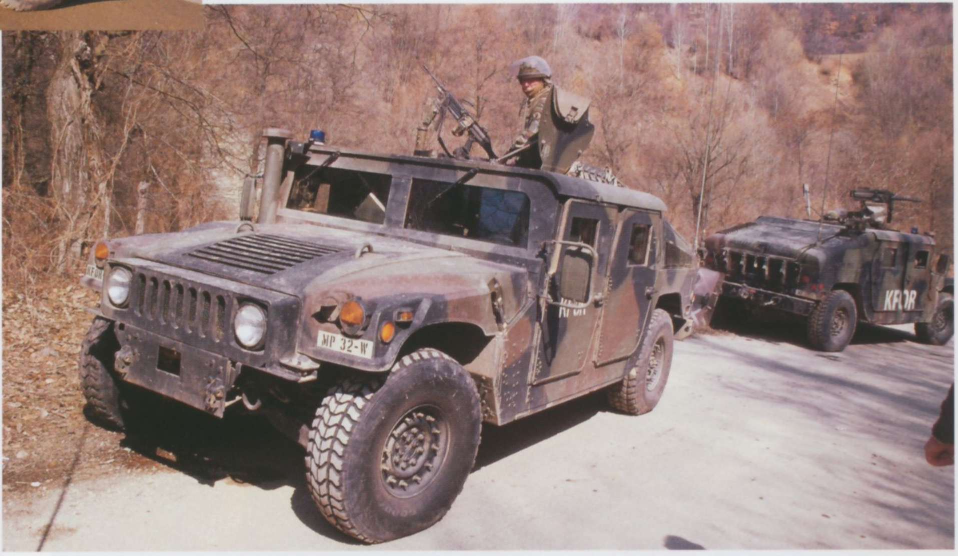
Engine type:	General Motors 6.5 liter V-8 Turbo charged diesel fuel injection engine.
Horsepower at 3,400 RPM:	190 HP
Maximum speed:	125 km/h
Curb weight:	4,447 kg (2,858 kg)
Pay load:	1,043 kg (2,317 kg)
Gross vehicle weight:	5,489 kg (5,216 kg)
Maximum towed load:	1,906 kg
Fuel tank capacity	94 liters
Seating capacity:	1 + 3
Wheelbase:	3.3m
Overall length / width / height:	4.99m /2.3m / 1.9m (5m /2.3m /1.88m)
Track width:	1.82m
Ground clearance:	0.3m
Turning radius:	7.62m
Angle of Approach	46.5 degrees
Angle of Departure	33.5 degrees
Acceleration:	0 to 48 km/h in 6.96 seconds (9.4 seconds) 0 to 80 km/h in 26.1 seconds (26.1 seconds)
Cruising range:	443 km
Fording:	0.77m and with extra kit 1.52m
Transmission:	General Motors 4L 80E 4- speed automatic type transmission with a maximum input torque rating of 451 lb. ft.. Gear ratios 1st 2.48:1 / 2nd 1.48:1 / 3rd 1.0:1 / 4th 0.75:1 / reverse 2.08: 1. Transfer case low 2.72: 1 and high 1.01:1
Wheels and tires:	16.5x 8.25, wheel with 1,747kg capacity. Tires are 37x 12.5 R 16.5 LT load range "D" radial with low profile run flat device on a two piece take apart wheel. Flat run capability is 48km
Suspension type:	Independent double A frame with open end coil springs and hydraulic shock absorbers
Brakes:	Hydraulically actuated, four wheel inboard mounted power disc brakes with dual reservoir master cylinder.



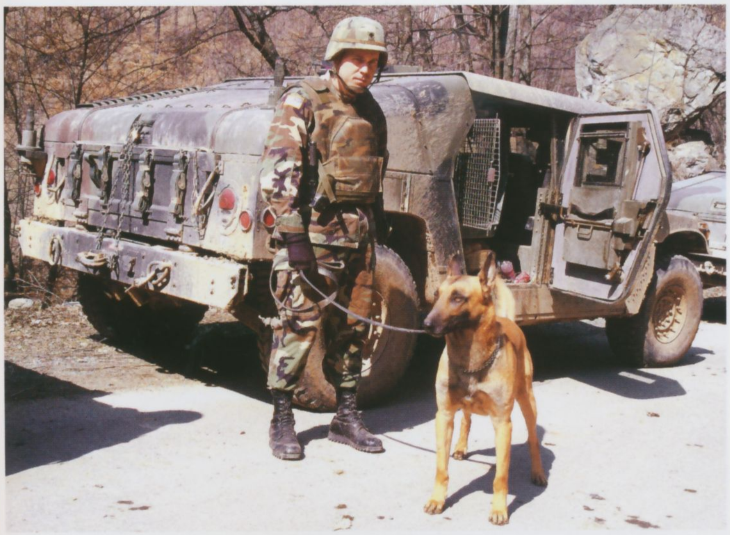
An M1114 from the 1st Battalion, 37th Armored Regiment is seen here at a Russian checkpoint in South-East Kosovo. Note the crew-made lattice in front of the windshield, which was also seen on an M1109 of the same unit. On the rear of the vehicle a receiver for the vehicle bound GPS satellite navigation system is mounted. The vehicle is armed with a 7.62mm M240 machine gun.



Seen early on a cold morning in March of 2000 in Dobrcane, this M1114 is armed with a 5.56mm M249 SAW. Note that the front right window of the vehicle is lowered and some rolls of concertina wire are stored on the large rear cargo shell door. HMMWVs parked along Kosovo roads like the one pictured here are a common site. Their crews watch traffic and are used as a show of force in the peace support operation. Often it looks like the soldiers are simply hanging around, but in fact nothing happens that is not spotted by their watchful eyes. The "show of force" concept means that troops are quite visible which unfortunately provides any aggressor with clear targets. Aiding this situation is the armor of the M1114, which is at times a lifesaver.

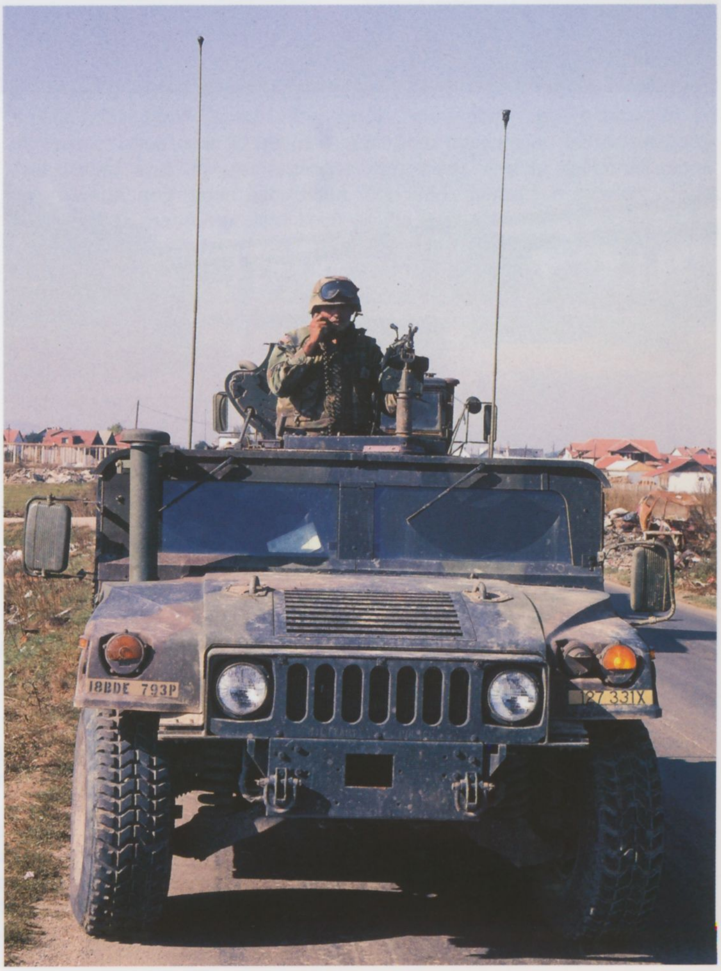


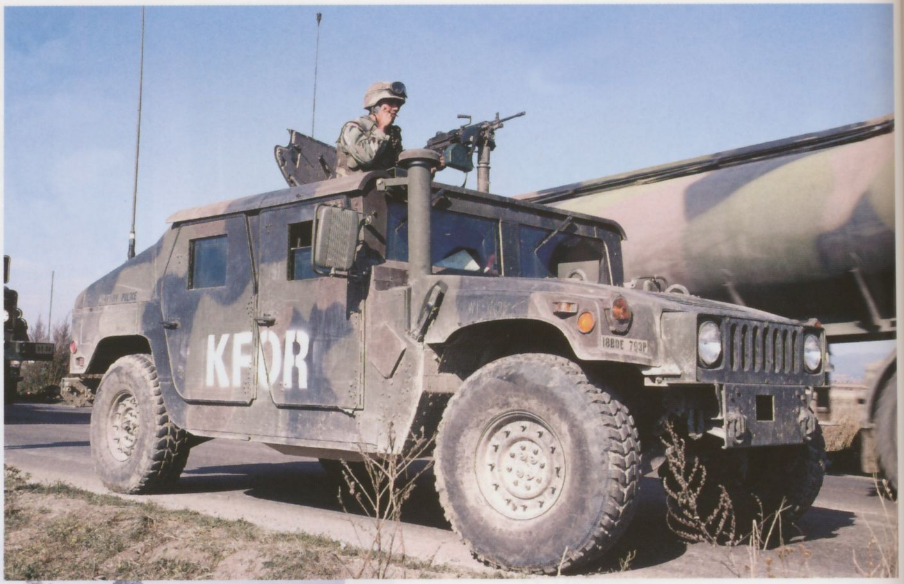
This pair of M1114s from a Military Police unit of the US lead MNB(E), were seen at a road block conducted by Albanians in the Strpce area in March of 2000. The vehicle in front is armed with an M249 while the one in the rear has an Mk.19 mounted on its weapons ring. The picture shows the M1114 from all sides and provides a good view of some of the main recognizable features. It has a prominent nose, an armored frame around the windscreen, doors without the X shaped pattern, the heavy-duty air conditioning system intake and a two part armored hatch on the roof. Note that the vehicle in front has a spare wheel strapped to the large cargo shell door and that the second vehicle is fitted with a winch behind its rear bumper.



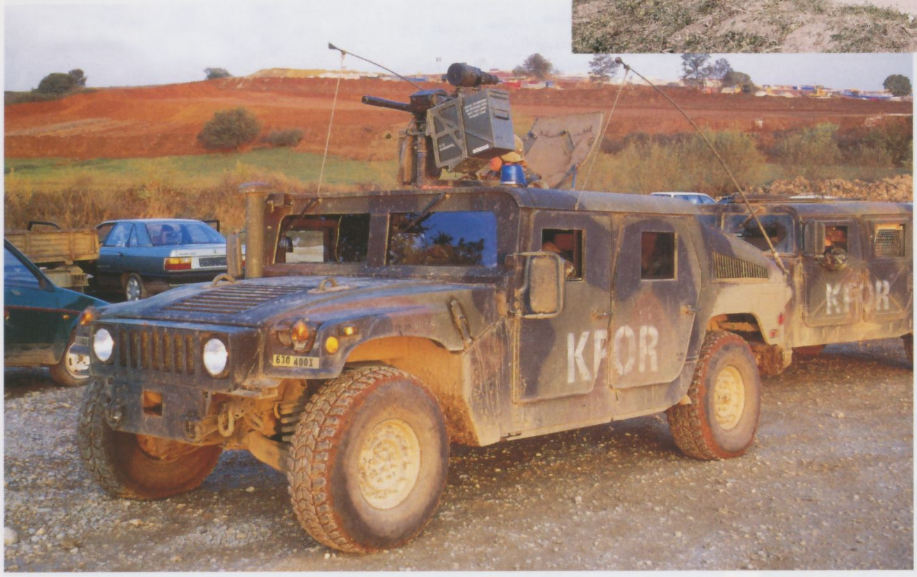
This M1114 was seen in use by a dog handling team from the US Military Police of KFOR's MNB(E) in March of 2000. Note the dog cage on the rear seat and the inside view of the armored door. This allows a view of the slide-down windows made out of high light, transmission transparent armor, also known as "white glass". If needed the windows can be used as gun portals, eliminating the need to leave the safety of the vehicle to return fire. Note that a winch is mounted centrally behind the rear bumper under the towing hook.

Front view of an M1114 seen on one of KFOR's main supply routes in Kosovo during a traffic accident operation. The vehicle belongs to the 793rd Military Police Battalion of the 18th Military Police Brigade. On the right side of the vehicle between the indicator and the headlights, a camouflaged light for tactical night driving is visible. The prominent nose of the M1114, a feature that all M1113s have, is also shown.

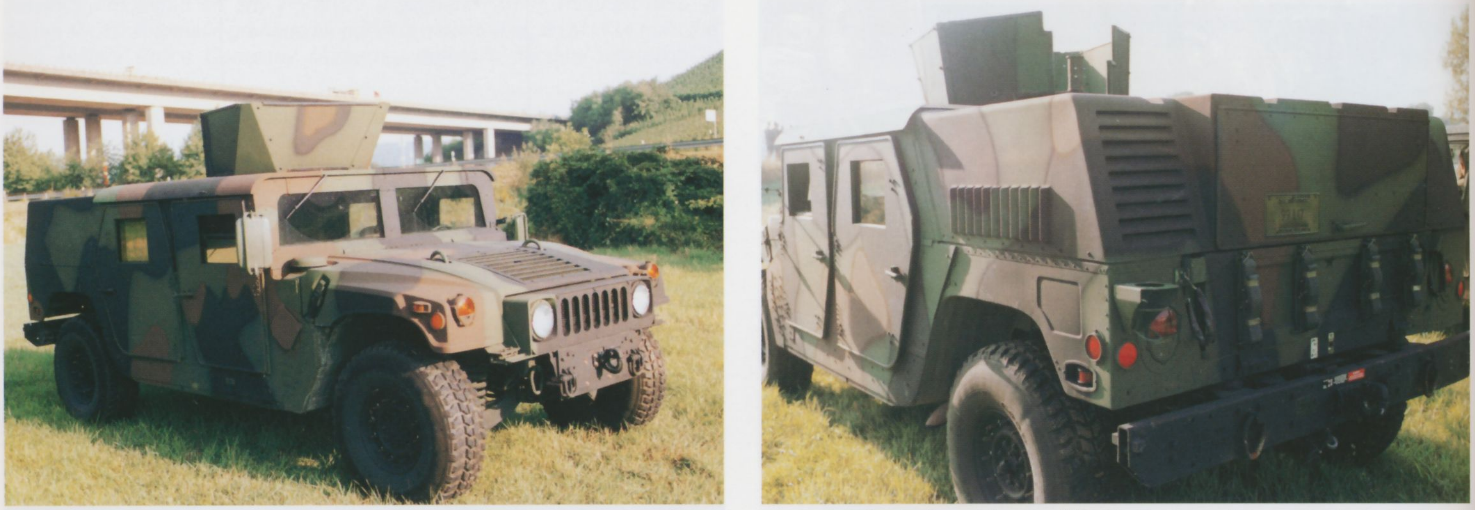




Belonging to the 793rd Military Police Battalion of the 18th Military Police Brigade of KFOR, this M1114 was seen in March 2000 near Urosevac in Kosovo. On the roof a pintle-mounted M249 SAW is manned by a crewmember. Note the extended air intake pipe, a common feature of the M1114s that were used by the US Army in Kosovo. This feature was not seen on earlier pictures of M1114s taken in Bosnia.



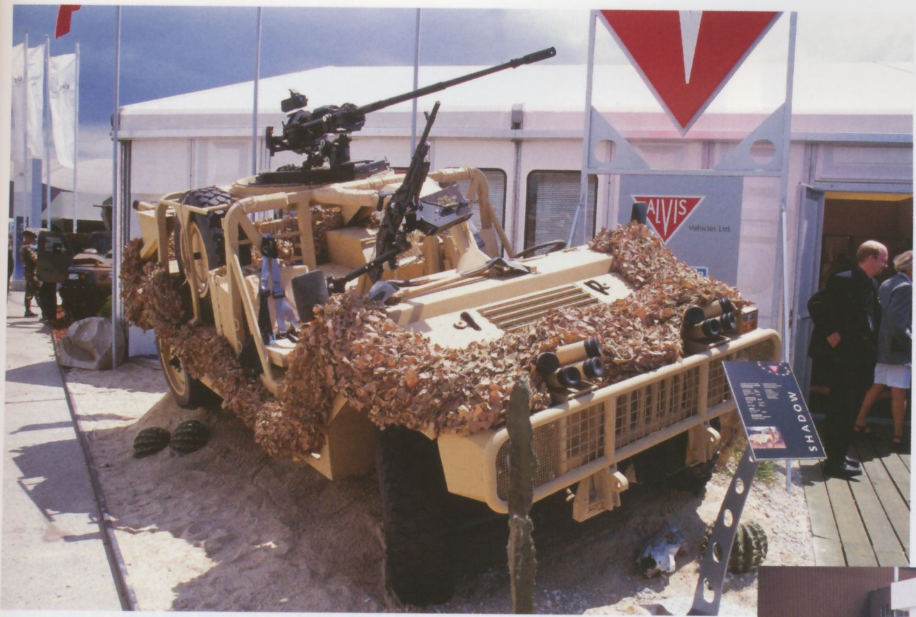
Prepared for a night patrol through rural areas of Kosovo, a night vision scope can be seen mounted on the Mk.19 of this M1114. The vehicle belongs to the 18th Military Police Brigade of MNB(E) of KFOR and was seen in March of 2000. The HMMWV armament carrier with basic armor can be distinguished from the M1114 by the X shaped stamp pattern on the side doors.



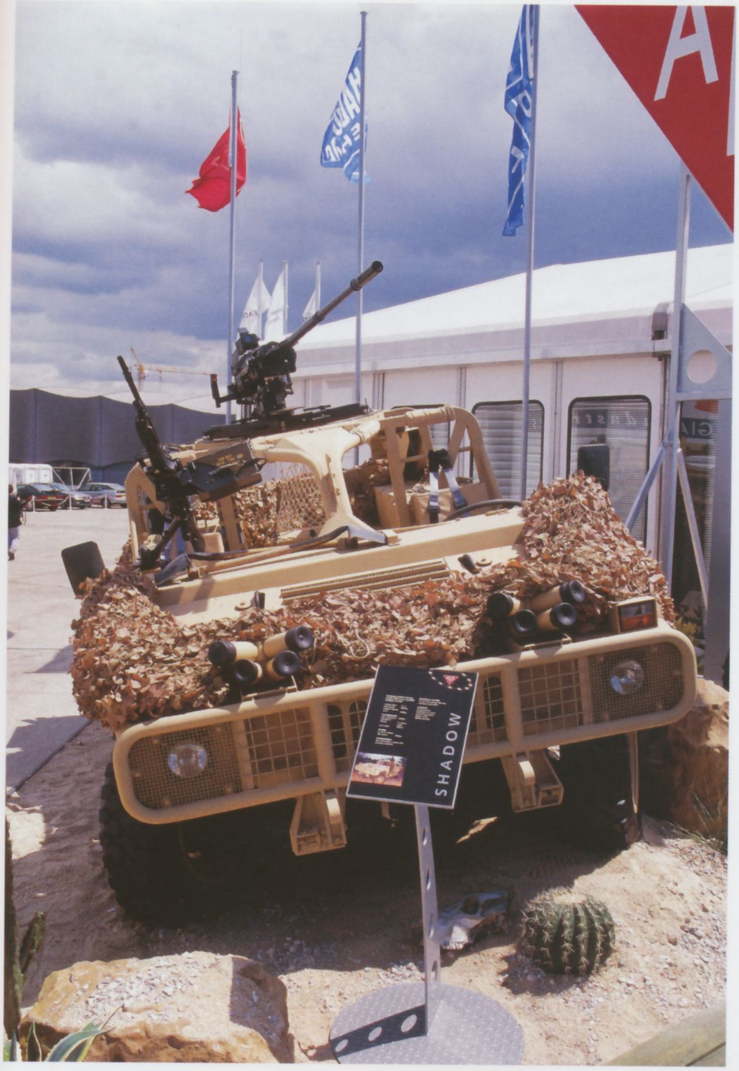
Based on the M1114, the M1116 HMMWV Armored Personnel Carrier was specially designed for the US Air Force and is available in five basic protection kits:

- *Kit A: Provides gunner with 360° protection against 7.62mm AP rounds. The turret can be outfitted with a 7.62mm or 12.7mm machine gun or the 40mm Mk.19 grenade launcher.*
- *Kit B: This adds overhead protection for the gunner from 155mm shell bursts. The 12.7mm M 82A1 Barrett Rifle can be mounted in the turret.*
- *Kit C: Provides additional under body protection for the crew through the use of ballistic steel and aramid lining used on the vehicle floor.*
- *Kit D: Improvement of Kit C to provide additional survivability.*
- *Kit E: Bolt-on armor for the engine compartment that attaches to the front bumper.*

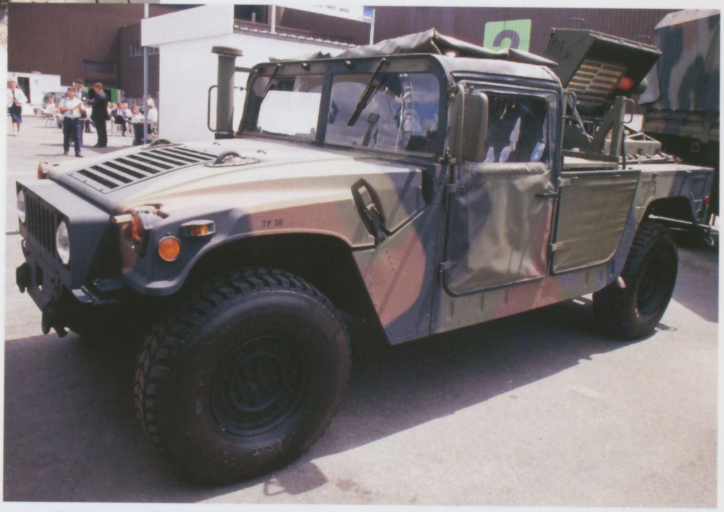
Additional configuration details of the M1116 are an air conditioning system, enlarged rear storage compartment, noise reduction kit and a new heating system. In the USAF the vehicle is used by security police and EOD units. The vehicle in the pictures is an M1116 from the USAF. It is equipped with protection kit A and was seen during exercise "Rolling Steel 99" in Germany in August of 1999. Even though there is no weapon installed on the roof mounted turret, the same range of weapons can be mounted on either the M1114, the M998A2 Series armament carriers or the M1116 HMMWV armored personnel carrier. (Wather Böhm)



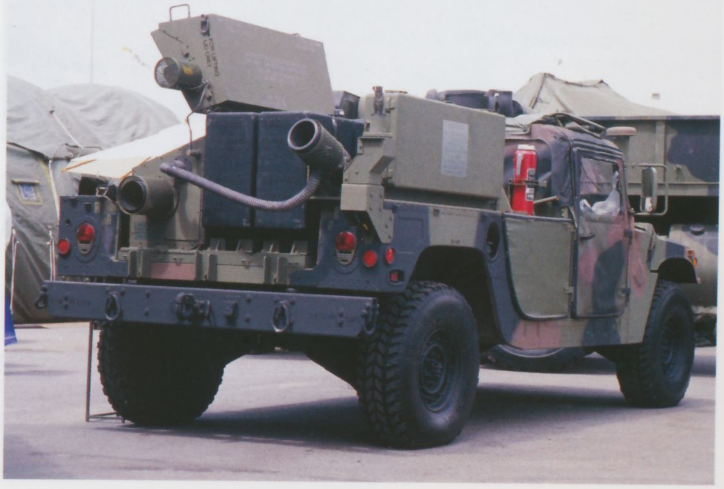
Like the M1114, the Alvis "Shadow" Offensive Strike Vehicle pictured here, is based on the M1113 Expanded Capacity Vehicle. The Shadow was designed to allow two vehicles to be transported inside a CH-47D Chinook for rapid deployment. In addition it can be air dropped on a Medium Stress Platform. The vehicle has a payload of 1,200 kg and can be outfitted with a large range of weapons. Here it has a 7.62mm GPMG machine gun, a 12.7mm machine gun and a total of sixteen smoke dischargers. The vehicle was on display at the EUROSATORY 2000 show in Paris.

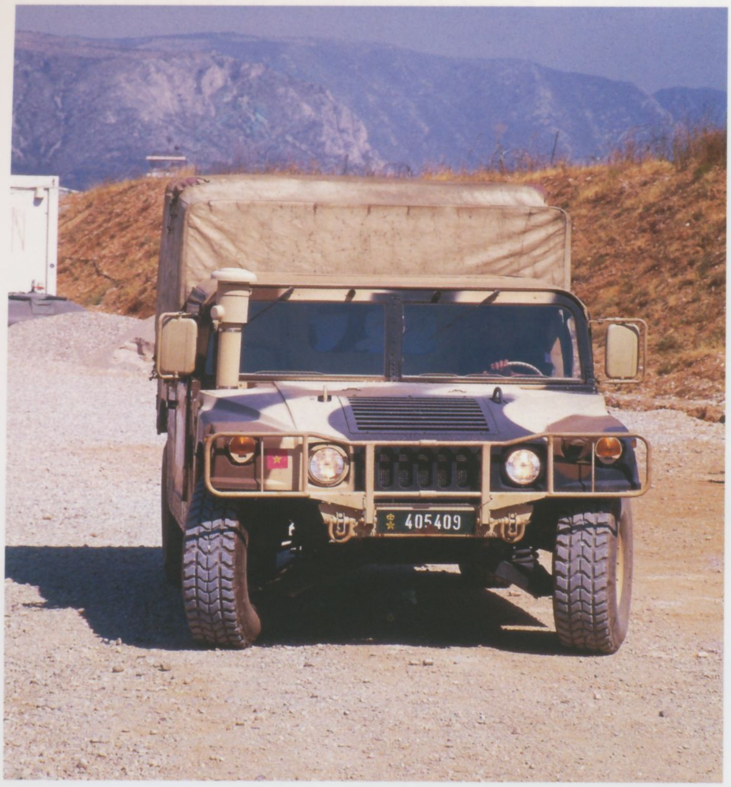


Like the M1113, the Alvis Shadow is powered by the GM 6.5 liter V-8 turbo diesel engine that delivers 190hp at 3,400 rpm. With a winch, this vehicle has an angle of approach of 52° and a ground clearance of 380mm. The overall length of the Shadow is 4,874mm, its width is 2,060mm, and in the pictured configuration is 1,800mm high. Even though it has not yet been introduced into service, the Shadow offers the customer a serious, uncompromising solution for forward operations, reconnaissance, border patrol and special operations.

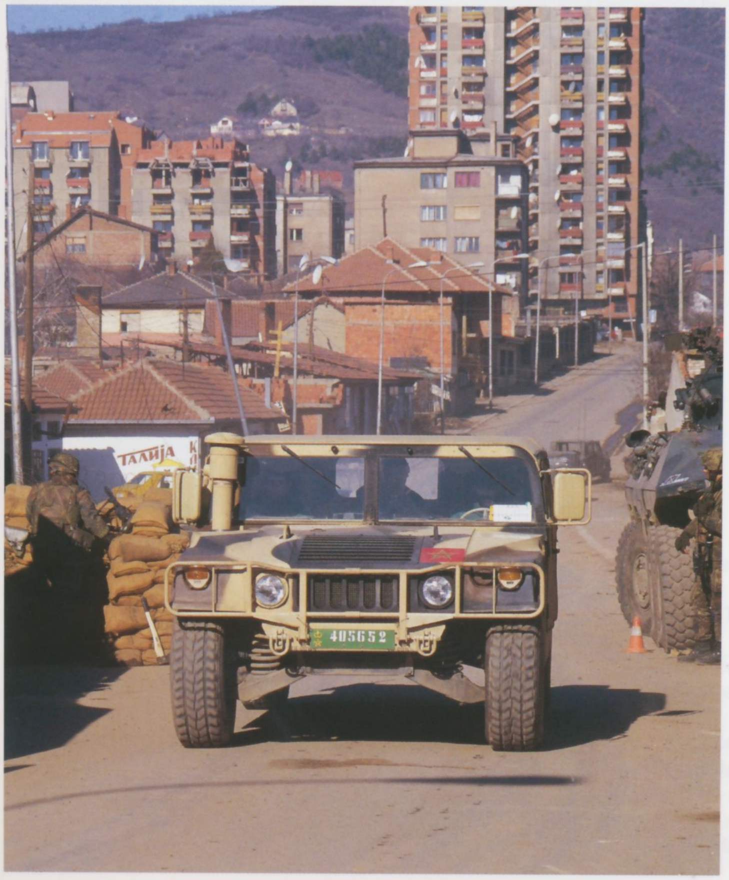


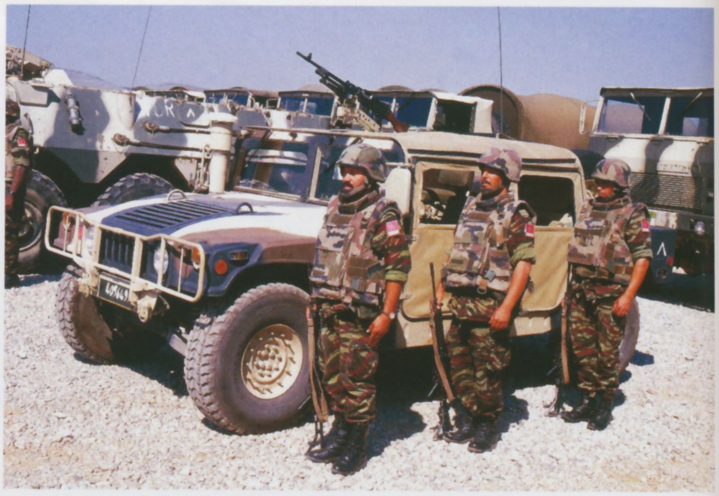
Taken at the EUROSATORY 2000 show in Paris, these two pictures show an M1113 HMMWV ECV fitted with the M56 "Coyote" Motorized Smoke Obscurant System. The smoke generating system provides 90 minutes of visual and 30 minutes of infrared obscuration without resupply. The visual and infrared screens can deny enemy reconnaissance, surveillance, and target acquisition. The M56 operates in support of light and airborne maneuver units such as the 21st Chemical Company of the 82nd Airborne Division who received the first 18 M56 "Coyotes" in November of 1998. In total 267 systems will be fielded with the US Army. Note the extended nose where the headlights are mounted, the most distinctive feature of the M1113. The pictures show the M 1113 in the exact role the vehicle was designed for, to carry heavier sheltered systems, weapons systems or any other system that requires a greater vehicle payload and carrying capacity. In addition the M1113 offers faster acceleration and improved performance.





This Moroccan M998A1 cargo and troop carrier with two door soft top enclosure and high tilt belongs to the Groupement d'Intervention Motorisé, an 800 soldier strong Moroccan motorized infantry battalion under the command of the French led MND(SE) of SFOR. It was seen in the summer of 1998 at the HQ of the Division located at Mostar airport. The battalion is equipped with French-made AMX-10RC wheeled reconnaissance vehicles and VAB wheeled APCs as well as US-made anti-tank weapons and HMMWVs. This is a typical inventory mixture for the armed forces of North African countries.





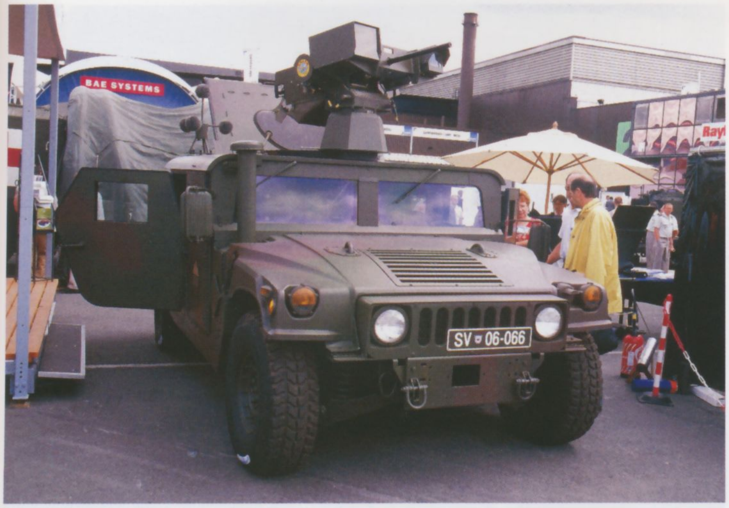
Next to their HMMWV, this picture shows the three-man crew of an M998A1 cargo and troop carrier with four door soft top enclosure belonging to the Moroccan SFOR contingent. Note that a 7.62mm FN MAG is mounted on the roll bar above the right rear seat. This is not the typical way to mount weapons on a HMMWV. Most nations use either a weapons carrier or mount a weapons ring in the center of the vehicle and use them without a roof. This vehicle was seen during the author's visit to this Moroccan unit in Mostar, Bosnia in 1998.

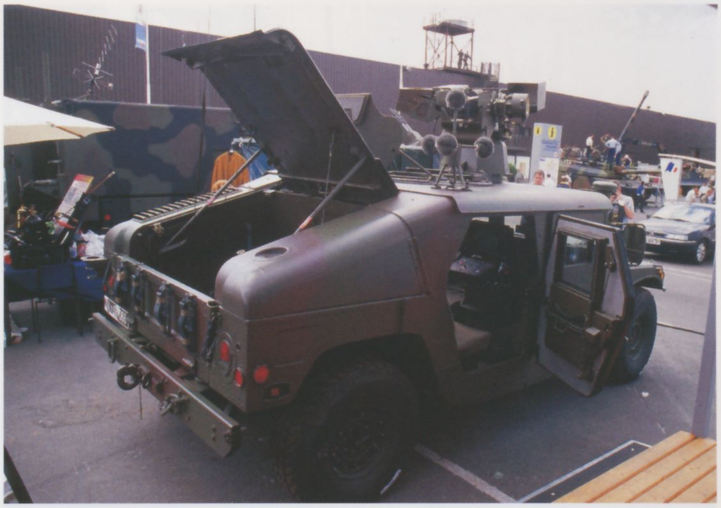
At the time of writing AM General has delivered more than 150,000 HMMWVs including the M998, M998A1, M998A2, M1113 Expanded Capacity Vehicle and Up-armored HMMWVs such as the M1114 Up-armored HMMWV Series. These have been sold to customers all over the world. The bulk of these, approximately 120,000 in total, were delivered to the US Army, US Air Force, US Navy, the United States Marine Corps and to various fire fighting and police units. The remaining 30,000 HMMWVs were delivered to more then three dozen overseas customers.

The numbers in this chapter are far from accurate as it is always difficult to obtain clear numbers from any military force. In addition, some sales contracts required AM General not to announce when vehicles have be delivered to certain nations. Therefore, some nations may be unavoidably omitted from the following list. Where no number is given less then ten vehicles have been delivered, other quantities are approximate and a (?) indicates an unknown number. These nations include: Abu Dhabi, Algeria, Bahrain (300), Bolivia (30), Bosnia and Herzegovina (?), Chad (20), China (?), Colombia (90), Djibouti (20), Ecuador (100), Egypt (70), Honduras (130), Israel (20), Jordan (130), Kuwait (770), Luxembourg (70), Morocco (?), Mexico (1850), Philippines (440), Qatar (40), Saudi Arabia (3850), Spain (?), Slovenia (?), Switzerland, Taiwan (5500), Thailand (280), Tunisia (350), Turkey, United Arab Emirates (?) and Venezuela. The information situation is even worse where the versions and numbers of vehicles of each respective version delivered to the individual nations is concerned.

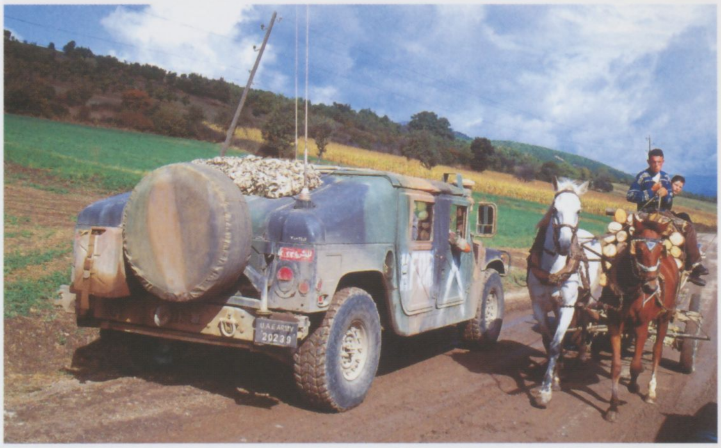
The following collection of pictures only provides an overview of HMMWVs in international service. The pictured vehicles in most cases are an example of a huge fleet of HMMWVs used by the individual nation. In addition, most nations received their HMMWVs with special modifications such as brush guards, extended exhaust pipes, air intakes and so on. However, where possible the matching US description number is given.

Passing through a German checkpoint in Mitrovica, this M998A1 cargo and troop carrier belonging to the Moroccan armed forces was seen in March of 2000. The vehicle was just leaving the Serbian part of the divided city and belongs to a Moroccan field hospital, which the country deployed under KFOR in Kosovo. Moroccan HMMWVs are fitted with an extended air intake on which a special filter is mounted to prevent the ever-present desert sand from getting into the engine. The vehicle is outfitted in the four door soft top enclosure configuration. Note the national insignia painted on the hood.

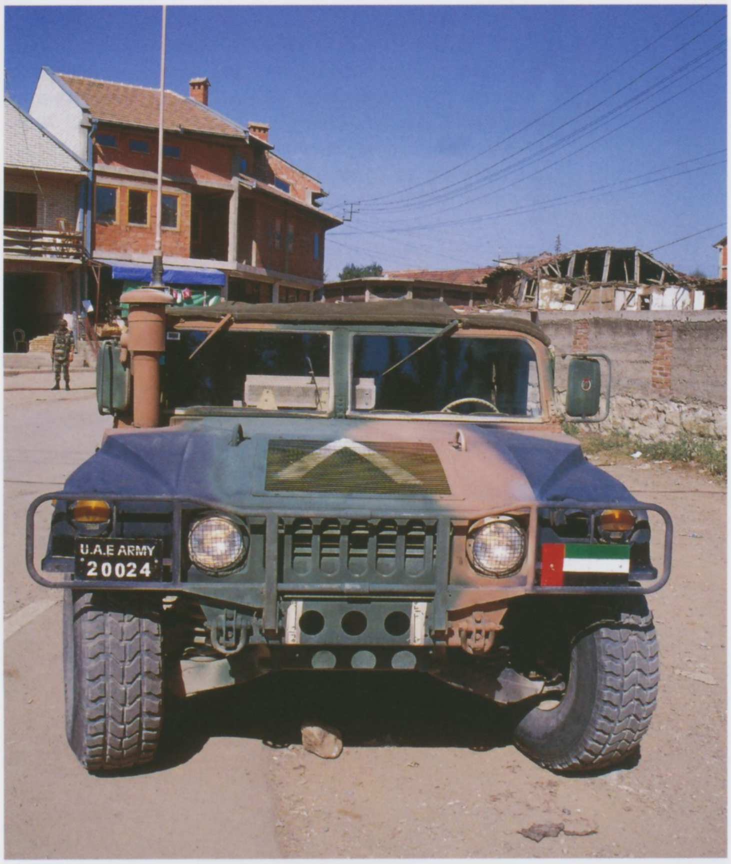




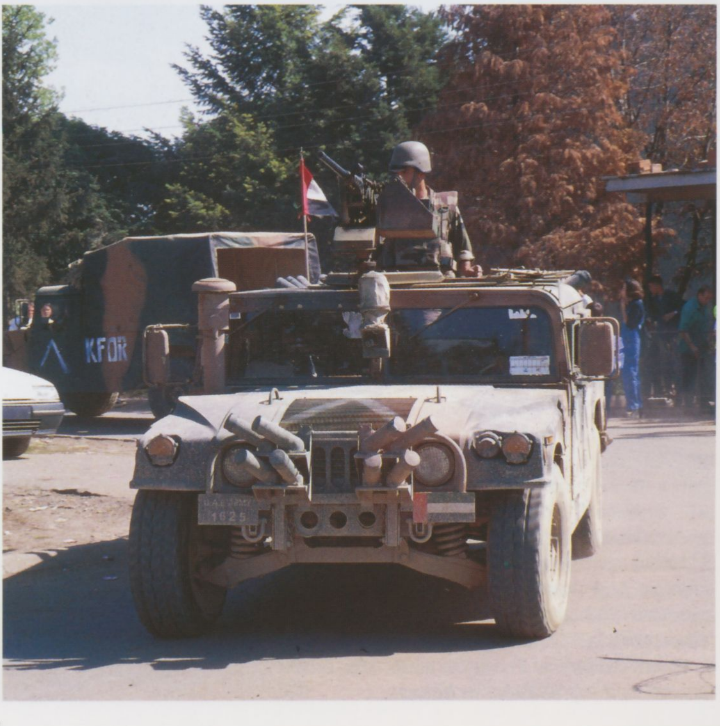
Displayed at the EUROSATORY 2000 show in Paris, this M1114 was manufactured by O'Gara - Hess & Eisenhardt to meet the requirements of the Slovenian Armed Forces for a wheeled armored reconnaissance vehicle. Basically the vehicle is identical to the M1114s of the US forces. It has a weapons ring mounted on the roof together with the typical two part hatch. On this weapons ring is a turret outfitted with a thermal imaging camera, video surveillance and a .50 cal machine gun. The turret is controlled from inside the vehicle via a control panel in front of the rear right seat. Note the Slovenian army number plates and camouflage pattern. As Slovenia is a mountainous country, where tracked and heavy vehicles often have problems, the HMMWV is an ideal solution for conducting reconnaissance operations. The vehicle is usually deployed in small groups on high ground and monitors the possible advance of any enemy attacker. The crew can then direct artillery fire or lead forces in a counter-attack.



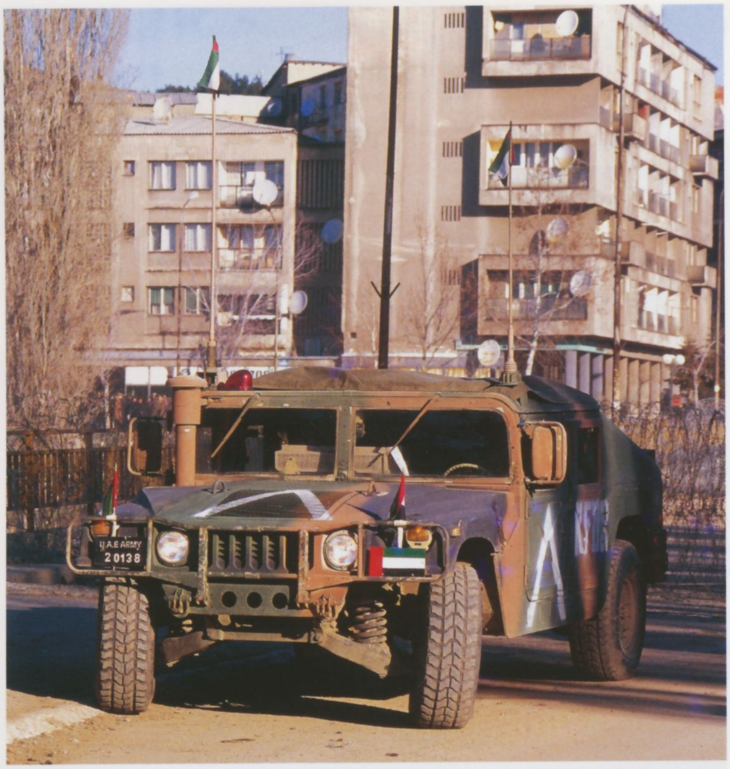
The M1025A1 armament carriers with basic armor of the United Arab Emirates have a spare wheel mounted at the rear. Here it can be seen on the road to Gojbulja, a Serb village near the Albanian city of Vucitrn meeting the more basic transport needs of the locals.



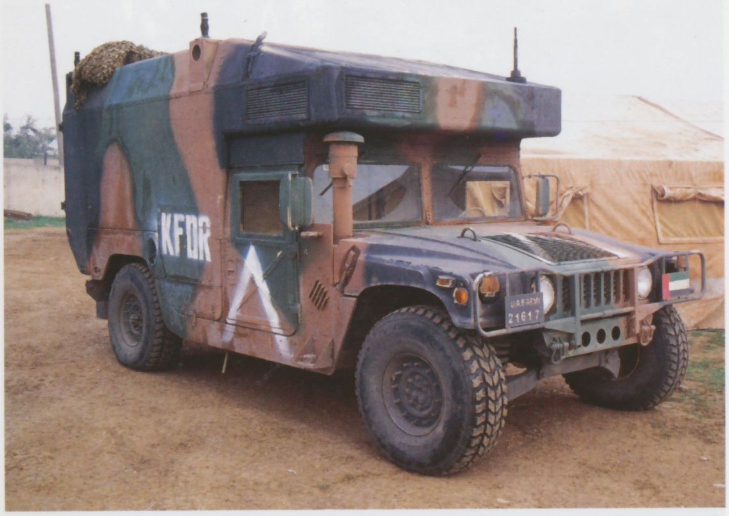
With 1,200 soldiers, the United Arab Emirates also deployed their Leclerc MBTs and BMP-3 APCs into Kosovo. Backing up their fleet of armored vehicles was a large quantity of HMMWVs. These included the M1025A1 armament carrier with basic armor. This vehicle was seen in November of 1999 next to a platoon in the city of Vucitrn. A canvas tarp has been placed over the vehicle to help keep the soldiers cool. Note the radio mounted between the driver and passenger.



With a mounted .50 cal M2HB machine gun this UAE M1025A1 armament carrier with basic armor can be seen setting off on patrol. It belongs to a Special Forces detachment of the UAE KFOR contingent and was seen in November of 1999. At the front of the vehicle eight electrically operated smoke grenade dischargers are mounted to the brush guard. Another set of eight smoke grenade dischargers are also mounted to the rear.

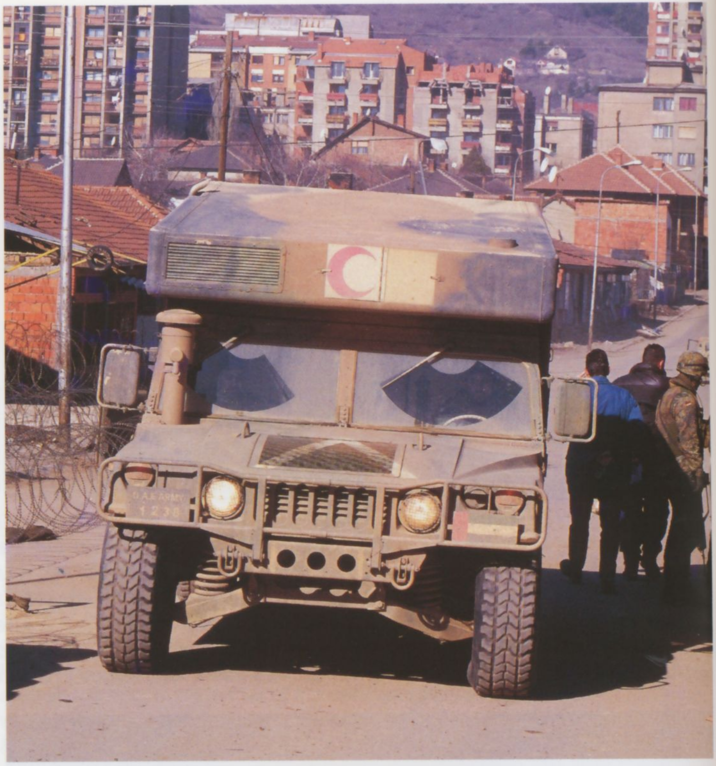


Seen in March of 2000 at the Mitrovica Bridge, one of the major trouble spots in Kosovo, this M1025A1 armament carrier with basic armor belongs to the Military Police of the United Arab Emirates. The UAE contingent belongs to the French led MNB(N) contingent of KFOR. Before the UAE soldiers deployed to Kosovo they received several weeks of training by French forces in southern France, as they had no previous experience with this type of operation.

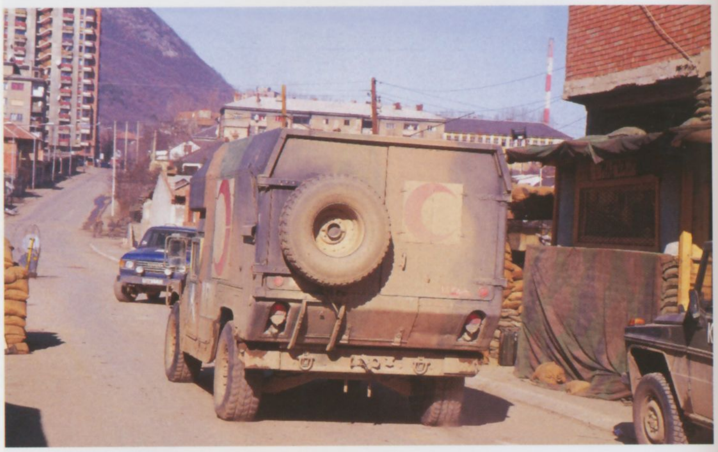


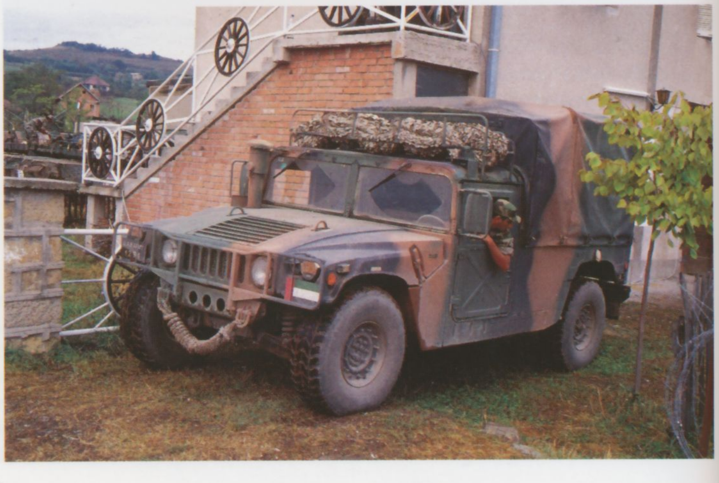
Among the HMMWV fleet used by the UAE is the M997A1 maxi-ambulance with four stretchers and basic armor. It was pictured at Vucitrn southeast of Mitrovica where the UAE forces HQ was situated in November 1999. Inside the vehicle are communications equipment, computers, a map board and other necessities. Note the fittings for an additional antenna mast on the right side of the vehicle just in front of the passenger seat.

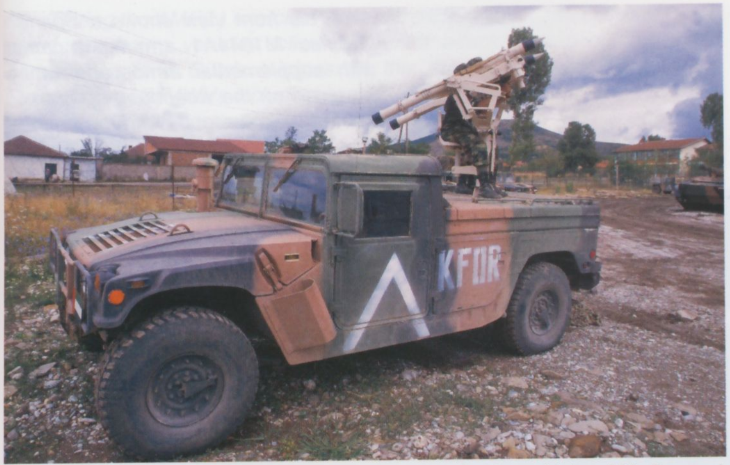
This UAE M998A1 cargo and troop carrier with two door hard top enclosure and high tilt has been modified to be similar to the US Army's M1069A1 prime mover. It has the doors with basic armor and an additional storage rack has been placed on the roof. This vehicle was seen at a permanent checkpoint of the UAE forces in Svinjare in November of 1999. Since the UAE is mostly desert, there is good reason for a camouflage net in desert pattern to be on the roof. This pattern also works very well during the hot and dry summer in Kosovo.



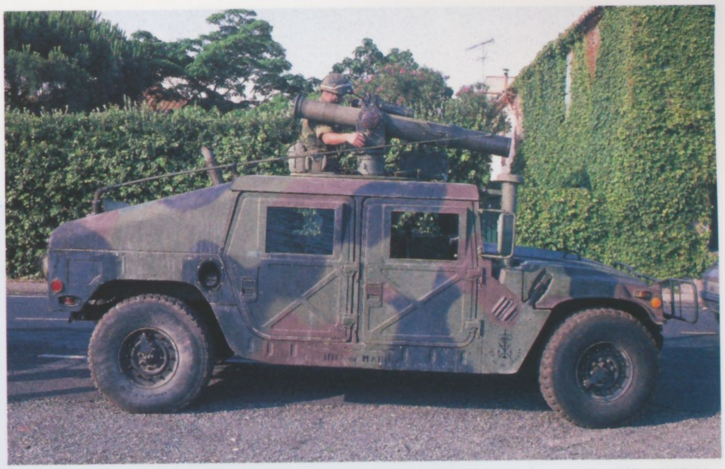
This M997A1 maxi-ambulance outfitted with four stretchers and basic armor was deployed by the UAE contingents HQ in Kosovo, it was seen in March of 2000 in Mitrovica. The only difference between it and a US Army version is the spare tire mounted at the rear. In addition to the two-man crew, the vehicle can also carry up to eight ambulatory patients or four litter patients. The rear compartment is air-conditioned and can be accessed by medical personnel through a door. Along with the air-conditioned system, an over-pressure NBC protection system is installed which allows for the use of the ambulance in contaminated areas. The UAE is a Muslim country so a red half moon marks it as a medical vehicle instead of a red cross.



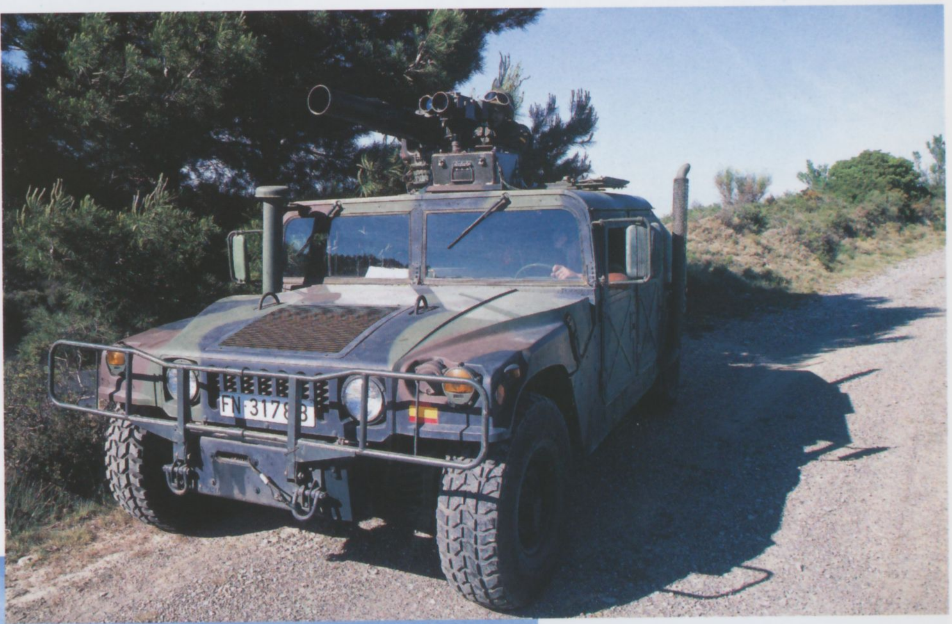




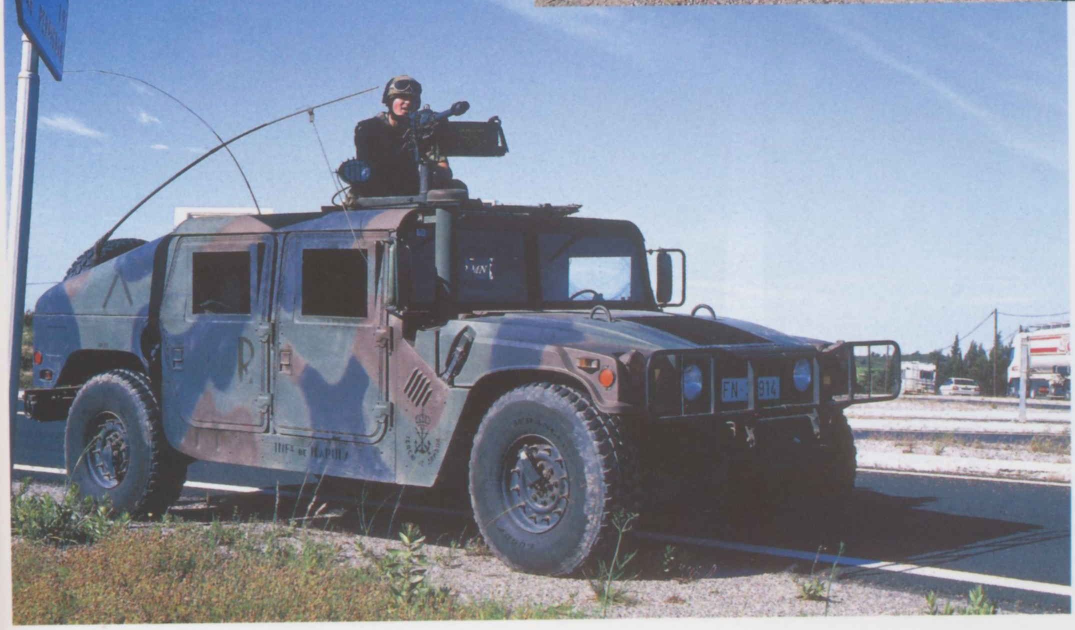
Based on the M998A1 HMMWV Series basic vehicle, AM General designed a platform for the Matra Mistral SAM. On the rear of the vehicle, the ATLAS lightweight twin round launcher system is mounted. It can also be dismounted and used on a tripod. With the Mistral two-stage low altitude surface to air missile system it is possible to effectively destroy enemy aircraft at a range of between 300 and 6,000 meters and at an altitude of between 15 and 4,500 meters. The infrared-guided warhead is of the 2.95kg HE fragmentation type and has both a contact and an active laser proximity fuse. This vehicle is from the United Arab Emirates KFOR contingent and was seen in Kosovo in October of 2000. (Yves Debay)



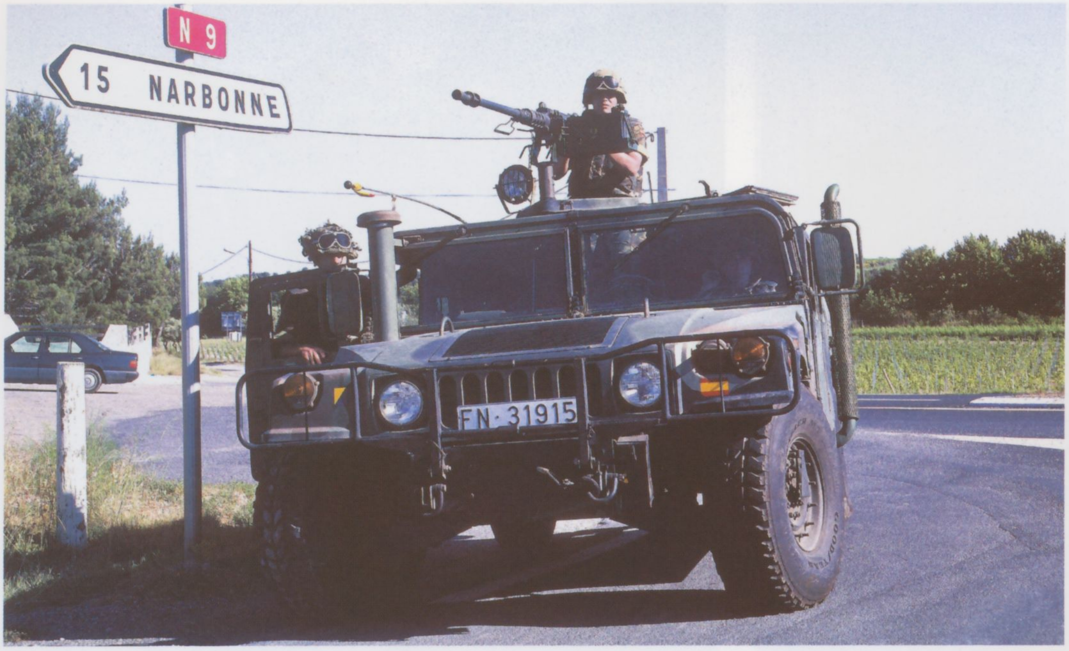
Apart from the US forces, only a few NATO nations use the HMMWV in significant numbers. These countries include Denmark (the MOWAG Eagle), Luxembourg, Turkey and Spain. In Spain, HMMWVs are used by the Spanish Marines. Taken in June of 1998, this picture shows an M1036A1 TOW missile carrier with basic armor and winch during the EUROFOR exercise "EOLE 98".



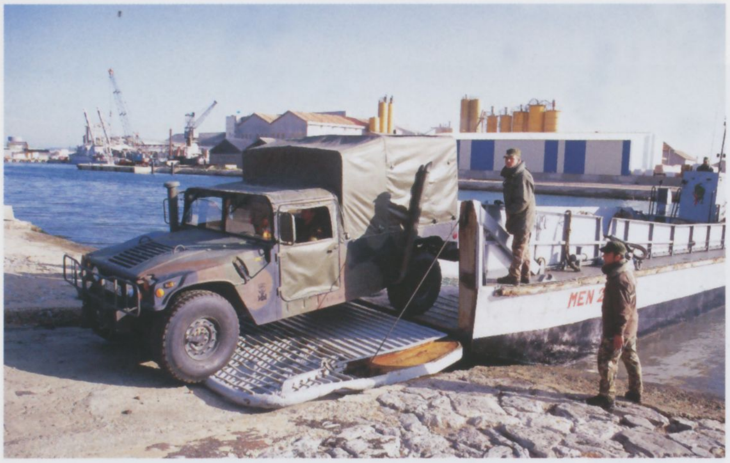
Like the USMC, the HMMWVs from the Spanish Marines are equipped with extended exhaust and air intakes. While the Spanish Army relies on Santana and Toyota cross country vehicles, the Spanish Marines, known as Tercio de Armada, use the HMMWV A1 series. This M1036A1 TOW missile carrier with basic armor and winch from the 2nd Battalion was seen during exercise "EOLE 98" in southern France.



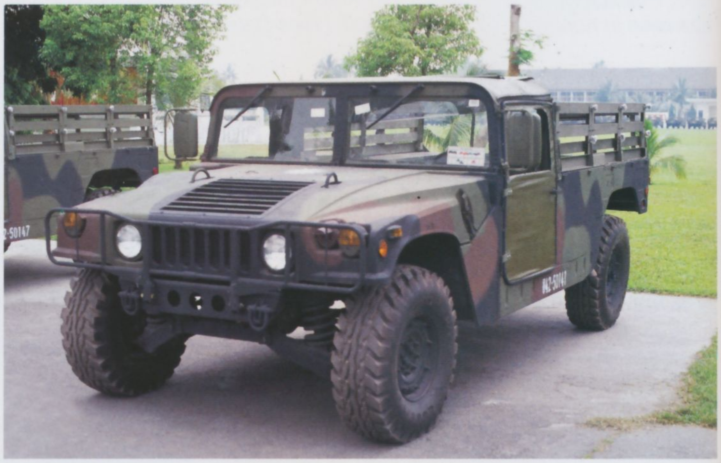
In addition to the M1036A1 TOW missile carrier with winch, the Spanish Marines also field HMMWVs with supplemental armor such as the M1044A1 armament carrier with winch. Pictured in southern France in the summer of 1998, this vehicle from the 2nd Battalion, Tercio de Armada has a .50 cal M2 machine gun and a searchlight mounted on its weapons ring. A spare wheel is also mounted at the vehicle's rear, a practice that is uncommon with US forces.



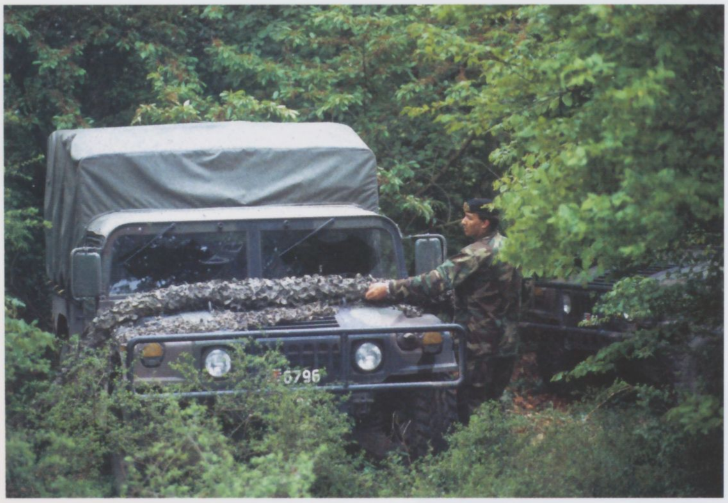
This front view shows a Spanish Marines M1044A1 armament carrier with supplemental armor and winch. Mounted on the weapons ring is a .50 cal M2 machine gun. With the optional fording kit that consists of extended exhaust and air intake pipes the fording capability of the HMMWV is improved by raising it from 0.76m to 1.52m.



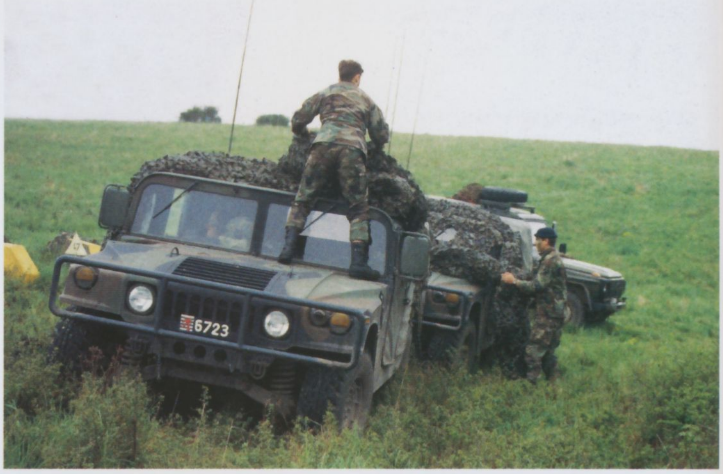
Brought ashore by an Italian Landing Craft Vehicle and Personnel, the picture shows an M1038A1 cargo and troop carrier with winch, two door soft top enclosure and high tilt from the 2nd Battalion, Tercio de Armada during the EUROFOR exercise "EOLE 98". Note the Tercio de Armada badge painted on the vehicle's side.



Several thousand HMMWVs are used by the Taiwanese armed forces. This picture shows an M998A1 cargo and troop carrier with two door soft top enclosure that has been fitted with back rests and benches for troop transport. The huge quantity of HMMWVs purchased by Taiwan includes nearly all available versions including armament carriers, TOW missile carriers, prime movers, shelter carriers and so on. (Yves Debay)

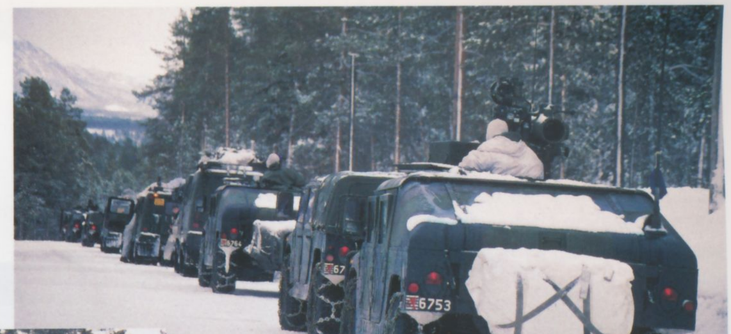


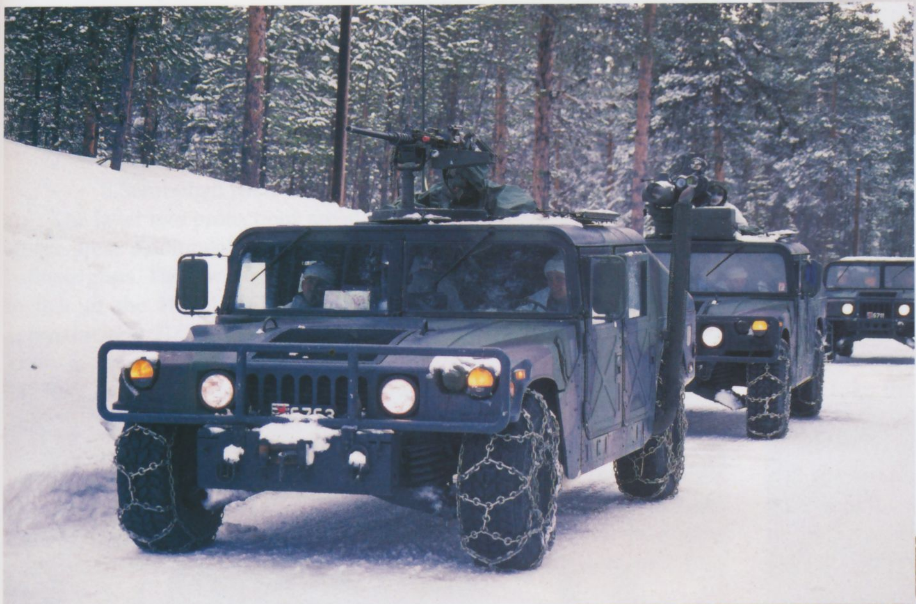
During the 1994 AMF(L) artillery exercise "Ardent Ground 94" on the Baumholder training area in Germany, this M998 cargo and troop carrier with two door soft top enclosure and high tilt from the Luxembourg Army was seen. The vehicle belongs to a mortar platoon, which was supporting the reconnaissance company of the 1st Light Infantry Battalion of the Luxembourg Army. In total the platoon is equipped with 11 M998 cargo and troop carriers.



Another picture of HMMWVs from the Luxembourg mortar platoon of the AMF(L) shows two M998 cargo and troop carriers with four door soft top enclosures. In addition to the eleven HMMWVs the platoon is equipped with, they also have two Mercedes G cross country vehicles and four MAN trucks. The HMMWVs of the Luxembourg Army are from the M998 Series, which like the US HMMWVs, are fitted with the mirrors of the A1 Series but not the new metal hood grill.

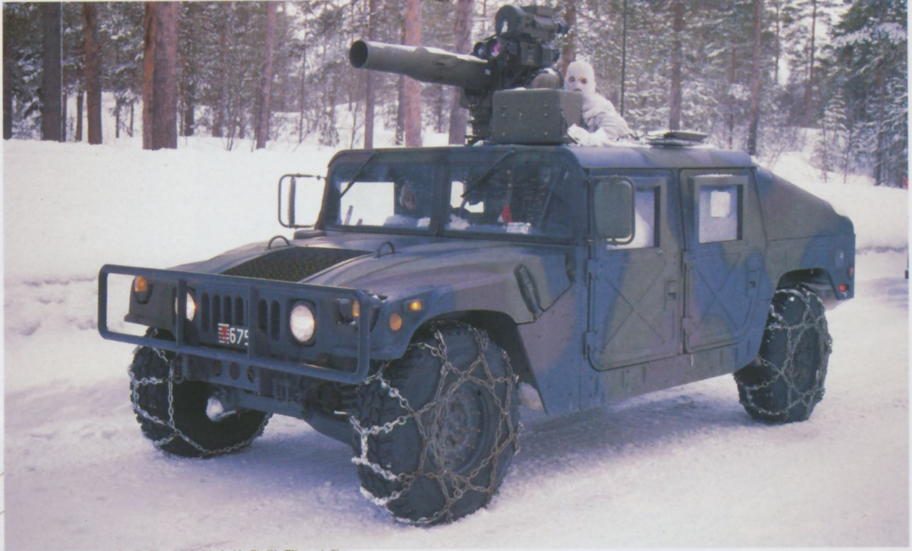
During the AMF(L) exercise "Adventure Express 97", a convoy of Dutch and Luxembourg vehicles follow a counter attack carried out by British paratroopers and Dutch marines. In this photo, there are at least six Luxembourg HMMWVs including two M966 TOW missile carriers with basic armor, one M998 cargo and troop carrier with four door soft top enclosure and an M1026 armament carrier with basic armor, winch and a .50 cal machine gun. Note that all vehicles are equipped with snow chains.

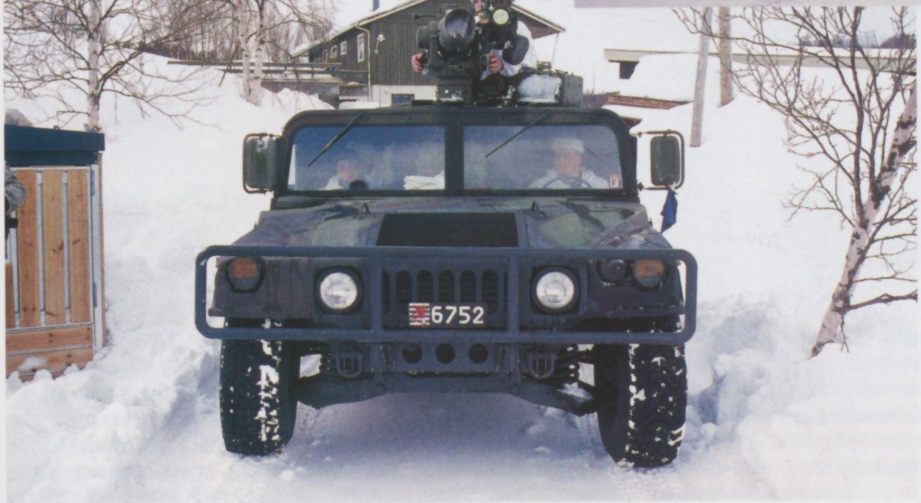




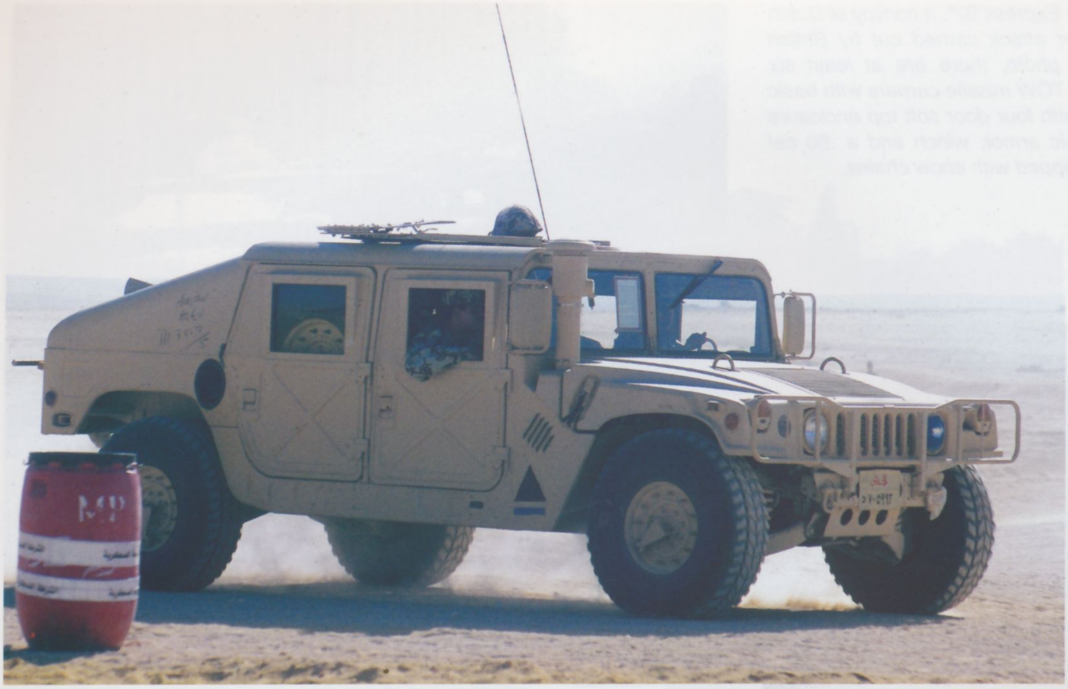
A 12.7mm M2HB machine gun is mounted on the weapons ring of this M1026 armament carrier with basic armor and winch from the Luxembourg Army's 1st Light Infantry Battalion. This is the unit's reconnaissance platoon, which is attached to NATO's AMF(L). It is structured in three platoons, with two being set up for reconnaissance and one as an anti-tank platoon. Of all the HMMWVs seen with this unit, only the one pictured here had the extended exhaust pipe like the vehicles of the US Marines.

The Luxembourg Army does not have any tracked vehicles such as main battle tanks or armored personnel carriers. It uses the M966 TOW missile carrier with basic armor as its heavy weapon system. For live firing exercises, the Scout Company of the 1st Light Infantry Battalion deploys to Germany or other NATO countries due to a lack of suitable training areas in their own country. This M966 TOW missile carrier with basic armor was pictured during the AMF(L) exercise "Adventure Express 97" in the Troms region of northern Norway.

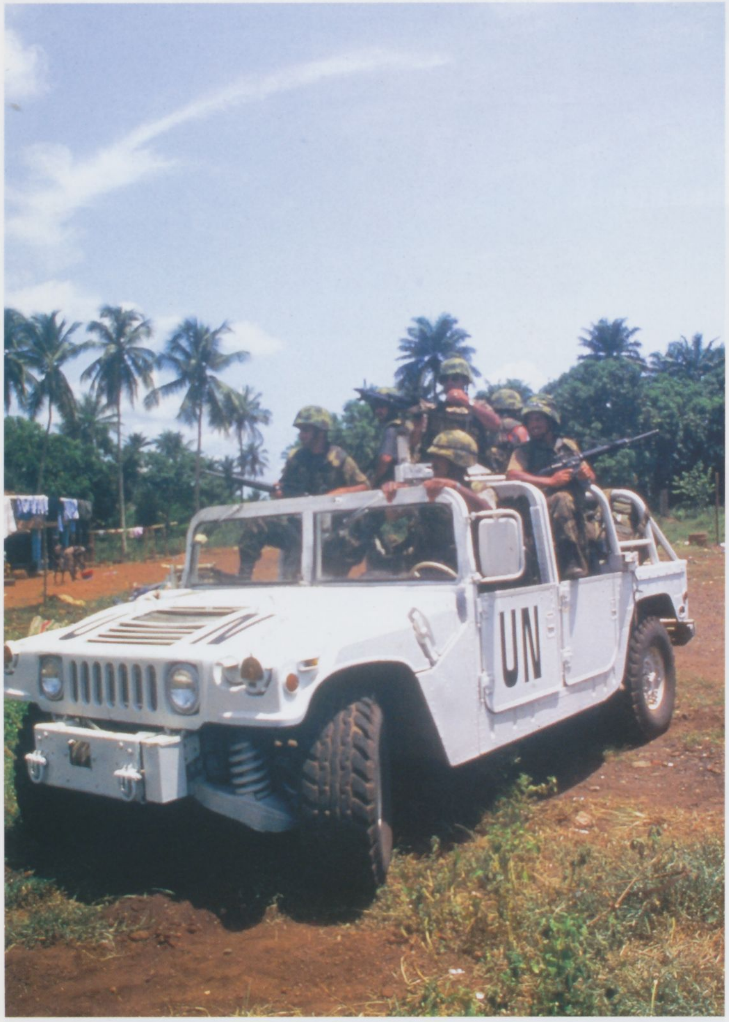




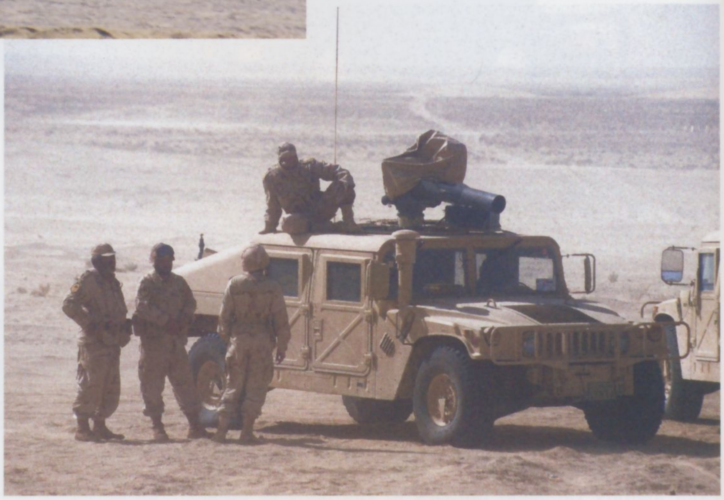
This anti tank platoon from the Scout Company of the 1st Light Infantry Battalion of the Luxembourg Army is equipped with six M966 TOW missile carriers with basic armor. The TOW missile system allows for the destruction of enemy armor from a distance of between 65 to 3,950 meters. The HMMWV provides tank killer teams with a fast cross country vehicle allowing for a quick change in firing positions. This ultimately makes it very difficult for enemy tank crews to detect them. (Britta Nurmann)



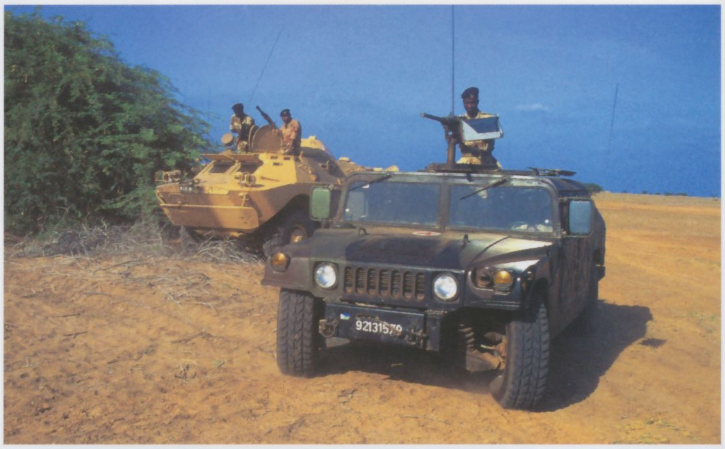
During the multinational exercise "Bright Star 99" in Egypt, this Egyptian Special Forces M1025A1 armament carrier with basic armor was seen. The vehicle is equipped with an extended air intake and is fitted with a special sand filter. Egypt is one of AM General's smaller customers. The bulk of Egyptian HMMWVs are armament carriers that are used by its special forces. (Yves Debay)



In the summer of 2000, this M1097A2 cargo and troop carrier from the Jordanian Army's Special Forces was seen on patrol in Sierra Leone. Jordan deployed 354 infantry troops to Sierra Leone as part of UNAMSIL. The contingent was equipped with M113 APCs and HMMWVs, which included some up-armored versions. The vehicle shown was designed by AM General for special operations. In addition to the M60 machine gun mounted on the weapons ring, roll cage weapon mounts can be seen on the left side of the vehicle to the rear and also on the right side of the passenger's seat next to the windshield. (Yves Debay)



After the Gulf War, Kuwait rebuilt its armed forces with new equipment. Among this they purchased British made Desert Warrior infantry fighting vehicles, US made M1A2 main battle tanks and a large quantity of HMMWVs. Here a Kuwaiti M1036A1 TOW missile carrier with basic armor and winch can be seen during exercise "Pearl of the West" in November of 1996. The exercise was conducted in northern Kuwait close to the Iraqi boarder. (Yves Debay)



Another nation on the African continent that uses HMMWVs is Djibouti. This picture contains a BRDM-2 from the former Soviet Union and an M1026A1 armament carrier with basic armor and winch that are both in use by the Djibouti Guluf Battalion. The armament carrier is equipped with a 12.7mm M2 machine gun and is still painted in the NATO three color camouflage pattern despite the fact that Djibouti is almost completely covered by desert. (Yves Debay)

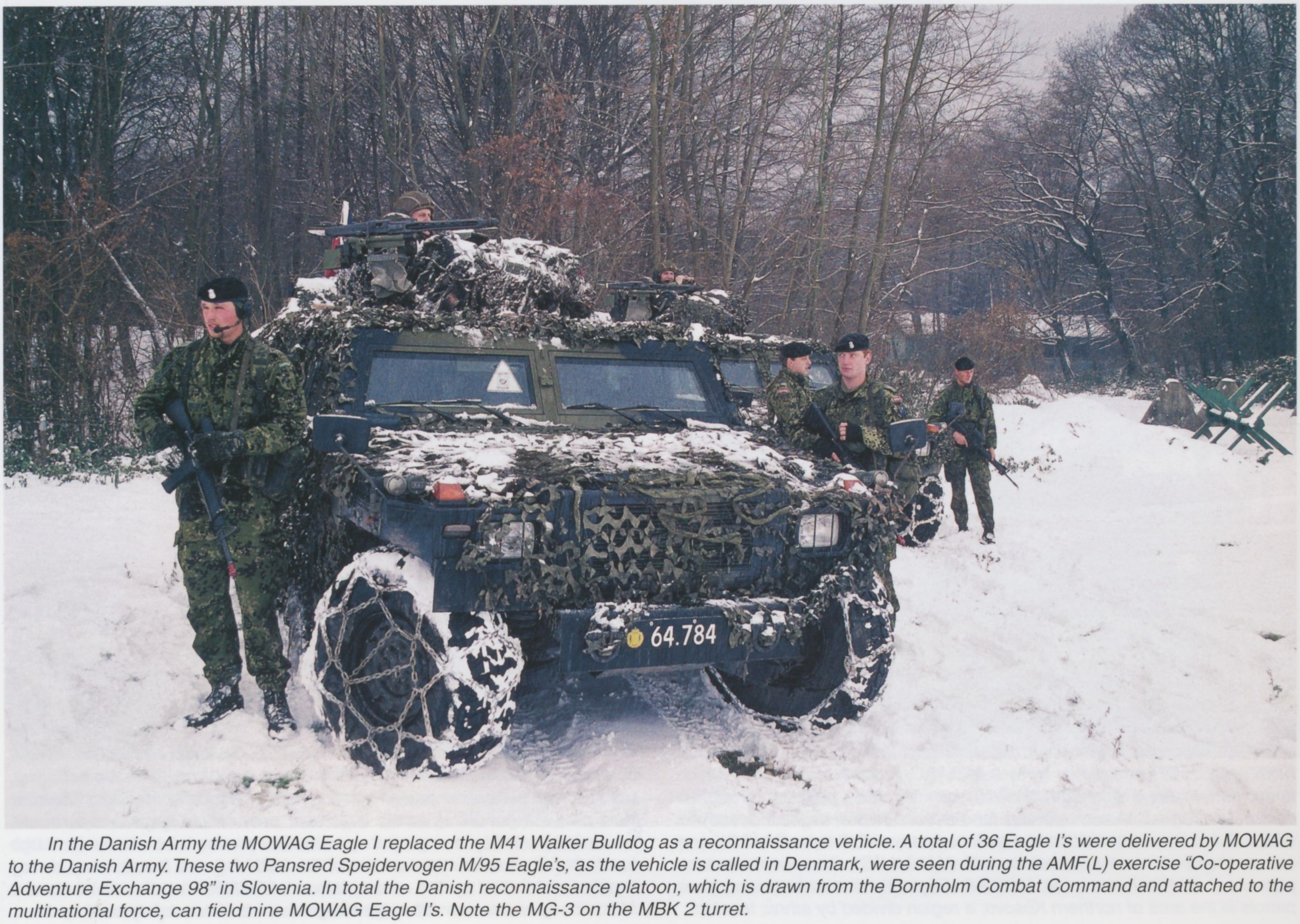
The MOWAG Eagle

Based on the AM General HMMWV, MOWAG (Motorwagenfabrik AG) in Switzerland designed the Eagle series of vehicles as a private venture to meet the Swiss Army's request for a light reconnaissance vehicle. Through 1990 and 1991 MOWAG built two prototypes, which were then put through extensive trials by the Swiss Army in 1991and 1992. The MOWAG Eagle I consists of three main elements: A modified M1097 Heavy HMMWV chassis built by AM General, an armored superstructure designed and manufactured by MOWAG and an MBK2 armored observation cupola developed and manufactured by MOWAG. The MOWAG Eagle I is outfitted with state of the art protection technology. It includes composite armor plates that have been mounted to the inner face of the aluminum plates. The crew and engine compartment of the Eagle have the following protection levels:

- 7.62mm steel core fired from a distance of 100m
- 7.62mm ball fired from a distance of 30m
- 5.56mm ball fired from a distance of 30m

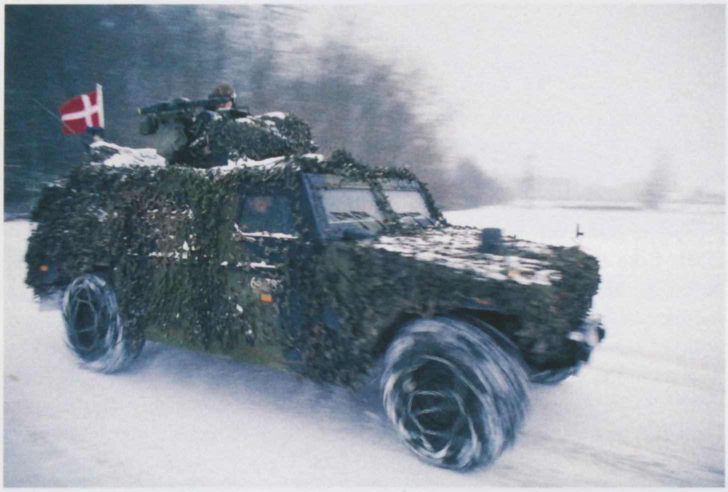
The latter two protections are also provided around the front and rear wheel area. Additionally the windows of the vehicle are made out of ballistic glass. The dimensions of the MOWAG Eagle I are nearly identical to that of the HMMWV except for the width that was increased by approximately 100mm. The mobility and performance of the MOWAG Eagle is also equal to that of the original HMMWV. The roof-mounted MBK 2 cupola can be rotated 360° and allows the crew to properly observe the battlefield. Located in the turret is a thermal day/night imaging device along with a roof mounted day periscope. Mounted to the right of the turret is the vehicle's armament, a 7.62mm MG-3. The weapon's elevation covers a range between –12° and +20°, while the thermal sight can be elevated from –12° to +15°. The machine gun can carry 400 rounds in the ready position and can be fired and reloaded from inside the turret, taking advantage of its armor protection. Side to side movement and elevation of the turret and optical systems is performed manually. Located to the rear and to the left side of the turret is a bank of six to eight electrically operated smoke dischargers. The vehicle's crew consists of four soldiers with the driver on the front left and the commander on the right. Located above both the driver and commander's seats are hatches where night vision equipment can be mounted. Two doors on the left and right side as well as a large door to the cargo compartment in the rear provide access to the vehicle. The cargo compartment provides sufficient space for spare ammunition, the crews' equipment and additional surveillance equipment.

After intensive trials of the first built prototype, the Swiss Army awarded a contract for 154 Eagle I's to MOWAG in December of 1993. Production was scheduled with the delivery of ten vehicles per month. Full delivery was completed after 15 months in 1995. The vehicles, known to the Swiss Army as Aufklärungsfahrzeug 93, were then used in their mechanized reconnaissance units, the reconnaissance elements of armored brigades, in infantry and armored battalions and in anti-tank companies. By 1997 the Swiss Army ordered a second batch of reconnaissance vehicles from MOWAG comprising 175 Eagle II's, of which also one prototype had been built. Delivery of this order was completed by mid 2001. Like the M1114 Up-armored HMMWV, the MOWAG Eagle II is based on the M1113 HMMWV Expanded Capacity Vehicle. It also has an increased carrying capacity and better engine performance. These vehicles will see service in reconnaissance units at the corps and division levels as well as in the armor battalions Type B and bicycle regiments. In addition to the Swiss Army, the MOWAG Eagle I is currently being used by the Danish Army which ordered an initial batch of 10 vehicles in mid 1995,

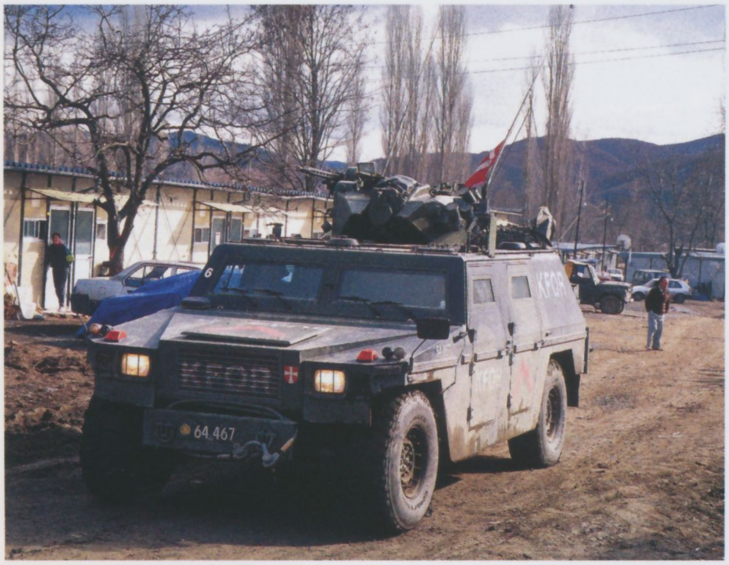


In the Danish Army the MOWAG Eagle I replaced the M41 Walker Bulldog as a reconnaissance vehicle. A total of 36 Eagle I's were delivered by MOWAG to the Danish Army. These two Pansred Spejdervogen M/95 Eagle's, as the vehicle is called in Denmark, were seen during the AMF(L) exercise "Co-operative Adventure Exchange 98" in Slovenia. In total the Danish reconnaissance platoon, which is drawn from the Bornholm Combat Command and attached to the multinational force, can field nine MOWAG Eagle I's. Note the MG-3 on the MBK 2 turret.

followed by a later order for an additional 26. Named Pansred Spejdervogen M/95 Eagle in the Danish Army, the MOWAG Eagle has replaced the M41 Walker Bulldog in the Danish Rapid Reaction Forces as an armored reconnaissance vehicle. It was seen for the first time in action with the Danish Army with IFOR in Bosnia in December of 1995. Operational use of the Danish Pansred Spejdervogen M/95 Eagle followed with SFOR in Bosnia and with KFOR in Kosovo. Currently under production for the Swiss Army is the MOWAG Eagle III. A total of 120 units have been ordered with delivery beginning in mid 2001. The MOWAG Eagle III is similar to the Eagle II but an extended higher roof for observation purposes has replaced the MBK 2 turret. Also on top of the vehicle is a mast that can be raised containing a thermal imaging system or other surveillance equipment. Currently only two prototypes and two pre-series production vehicles exist of the Eagle III.



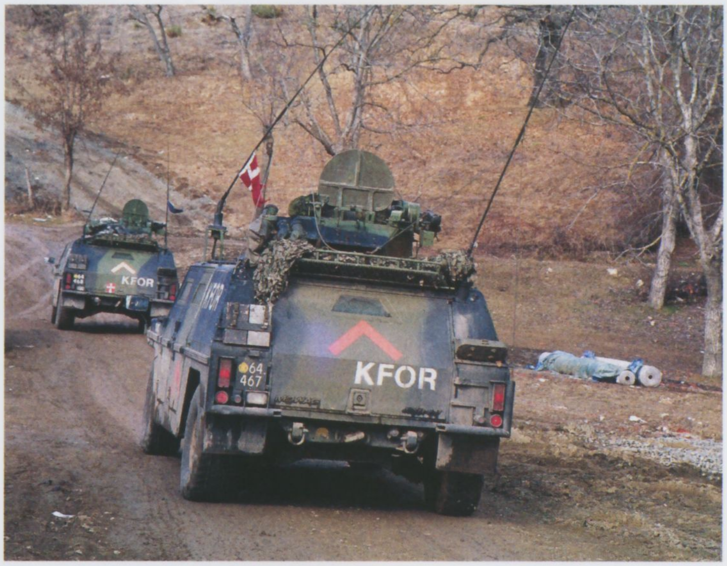
The MOWAG Eagle I has the same speed and cross country ability as the original M1097 Heavy HMMWV built by AM General. Here a Danish Army MOWAG Eagle I in snow chains can be seen at a high speed on an icy road in Slovenia during exercise "Co-operative Adventure Exchange 98". The basic configuration of the Danish vehicle includes, an NBC protection system of the overpressure type allowing the crew to operate in a contaminated area, power assisted steering for easy handling and air conditioning system. In addition, the vehicle can be fitted with CTIS and a front mounted self-recovery winch with a 5.4 tonne capacity.



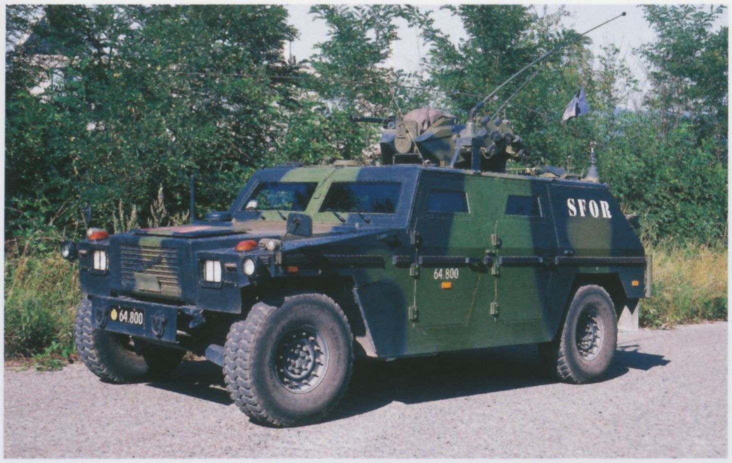
Currently the last operational deployment of the Danish MOWAG Eagle I was with KFOR in Kosovo. Here a MOWAG Eagle I of DANBAT, which forms part of the French-led MNB(N), can be seen passing through a container village that was erected for Albanians next to their destroyed village Zubin Potok. In addition to a tank company with Leopard 1A5DK and two mechanized infantry companies with M113 APCs, the reconnaissance platoon of DANBAT has nine MOWAG Eagle I's. It conducts countless patrols in the area of northern Kosovo, a region divided by ethnic tension.

Technical data: MOWAG Eagle II 4X4

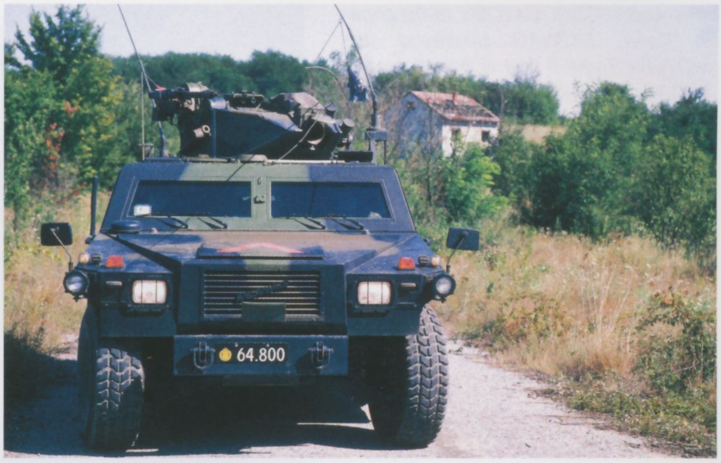
Engine type:	General Motors 6.5 liter V-8 Turbo charged diesel fuel injection engine.
Horsepower at 3,400 RPM:	190 HP
Maximum speed:	119 km/h reverse 33 km/h
Curb weight:	4,100 kg
Pay load:	1,400 kg
Gross vehicle weight:	5,500 kg
Fuel tank capacity	95 liters
Seating capacity:	1 + 3
Wheelbase:	3.3m
Overall length / width / height over hull:	4.9m /2.28m / 1.75m
Track width:	1.82m
Ground clearance:	0.4m
Turning radius:	7.62m
Angle of approach:	60° degrees
Angle of departure:	50° degrees
Cruising range:	450 km on hard level surface
Fording:	0.76
Transmission:	General Motors 4L 80E 4-speed automatic type transmission with a maximum input torque rating of 451 lb. ft. Gear ratios 1st 2.48:1 / 2nd 1.48:1 / 3rd 1.0:1 / 4th 0.75:1 / reverse 2.08: 1. Transfer case low 2.72: 1 and high 1.01:1
Wheels and tires:	16.5x 8.25, wheel with 1,747kg capacity. Tires are 37x 12.5 R 16.5 LT load range "D" radial with low profile run flat device on two piece take apart wheel. Flat run capability is 48 km.
Suspension type:	Independent double A frame with open end coil springs and hydraulic shock absorbers
Brakes:	Hydraulically actuated, four wheel inboard mounted power disc brakes with dual reservoir master cylinder.



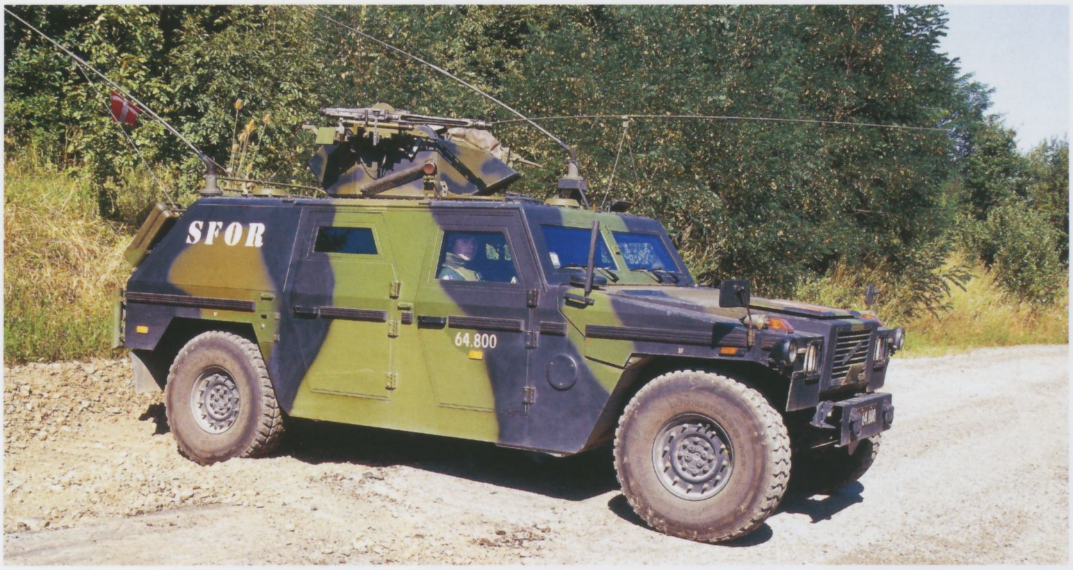
The MOWAG Eagle I was used in Bosnia with IFOR and SFOR. As had been done before, the Danish KFOR forces are using them for patrolling, transporting vulnerable persons and reconnaissance operations. The rear view allows a good look at the large rear door to the cargo compartment, which is opened by swinging it upward. The picture also shows the large hatch that is situated in the center of the MBK 2 turret. It was taken during a patrol conducted by the recce platoon of DANBAT northwest of Kosova Mitrovica near a former Albanian village that had been totally destroyed.



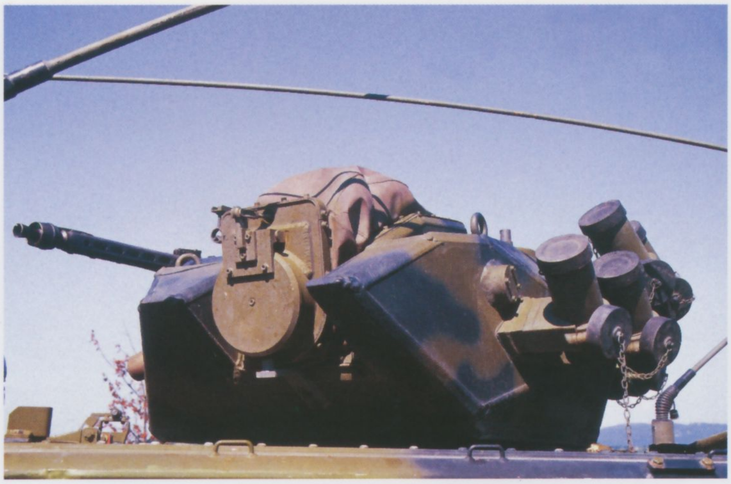
The first time the MOWAG Eagle I was used in an operational environment, was by the Danish Army in 1996 when vehicles were deployed under the Danish IFOR contingent. Subsequently the vehicles were then used by the Danish contingent of SFOR. The vehicle in this picture was seen in August 1998 near Doboi in the AOR of the Nordic/Polish Brigade of MND(N) in Bosnia. The MOWAG Eagle I was used for patrolling, transporting vulnerable people, liaison missions in dangerous areas and reconnaissance operations. The vehicle in the picture was used by the brigade commander during that period.



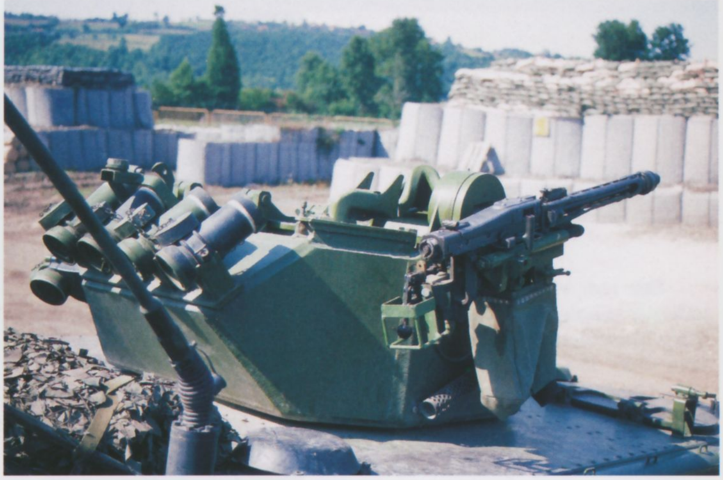
The MOWAG Eagle I, which is based on the M1097 Heavy HMMWV, has a top speed of 125km/h and a gross vehicle weight of 5,100kg including a payload of 1,200kg. The vehicle is powered by the General Motors 6.5 liter V-8 diesel fuel injection engine that is normally aspirated and develops 160 hp. The picture was taken during a patrol on the outskirts of Doboi in August of 1998 when MOWAG Eagle I's were deployed with DANBAT from the Nordic/Polish Brigade.



Another picture of the same MOWAG Eagle I shows the smaller bullet proof window of the rear side door. This was later replaced on the Eagle II by one similar in the size to that of the front side door. Even with the composite armor the MOWAG Eagle I can be identified as belonging to the HMMWV family. Another armored vehicle, known as the Cobra, is produced by the Turkish manufacturer Otokar and is also based on the M1113 Expanded Capacity Vehicle HMMWV. Designed as an APC, the Cobra is available in a number of different variants. These include with and without turrets, an amphibious version and a TOW missile carrier. The Cobra is currently produced for the Turkish Armed Forces and was first issued at the end of 1997.

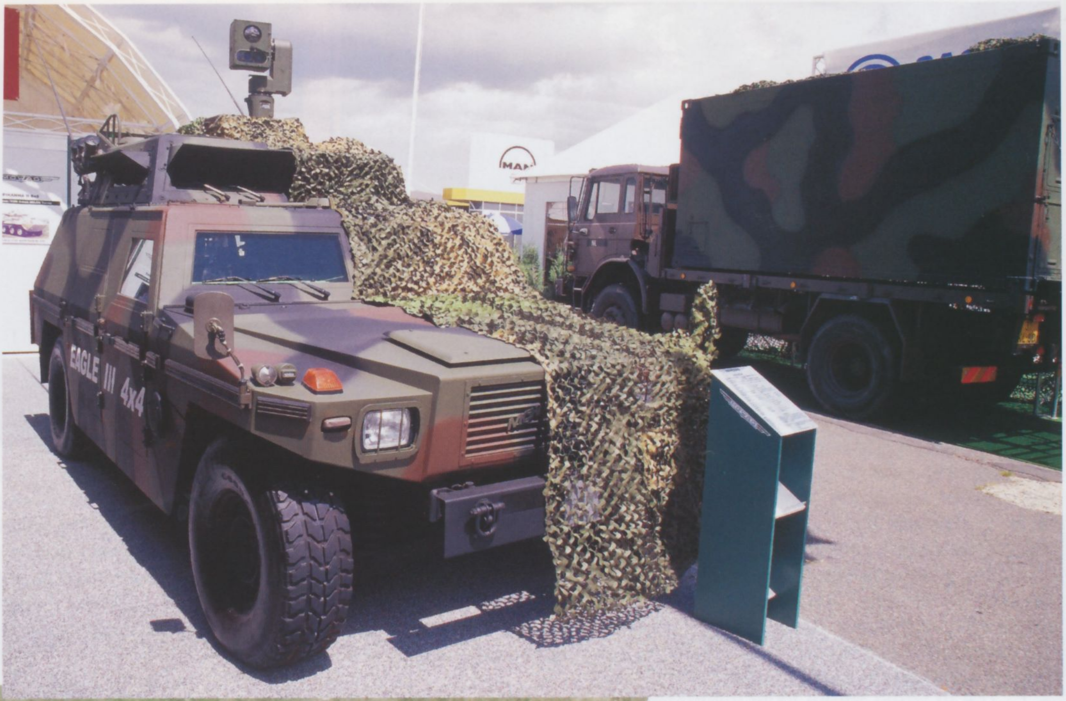


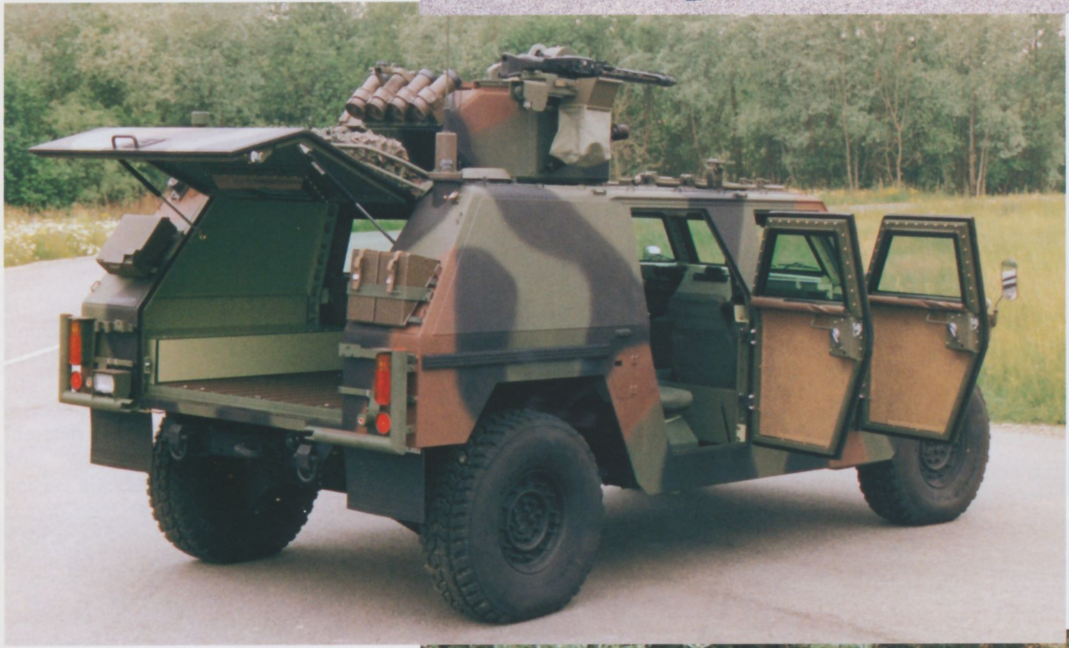
The observation cupola MBK 2 turret can be rotated 360° and also contains a thermal day/night imaging device located behind a closed shutter. Mounted externally to the turret, and here visible in the rear, is a 7.62mm MG-3 which can be fired and loaded from inside the turret. The elevation of the weapon covers a range from –12° to +20° while the thermal sight can be elevated from –12° to +15°. To the rear and to the left side of the turret a bank of electrically operated smoke dischargers can be seen.



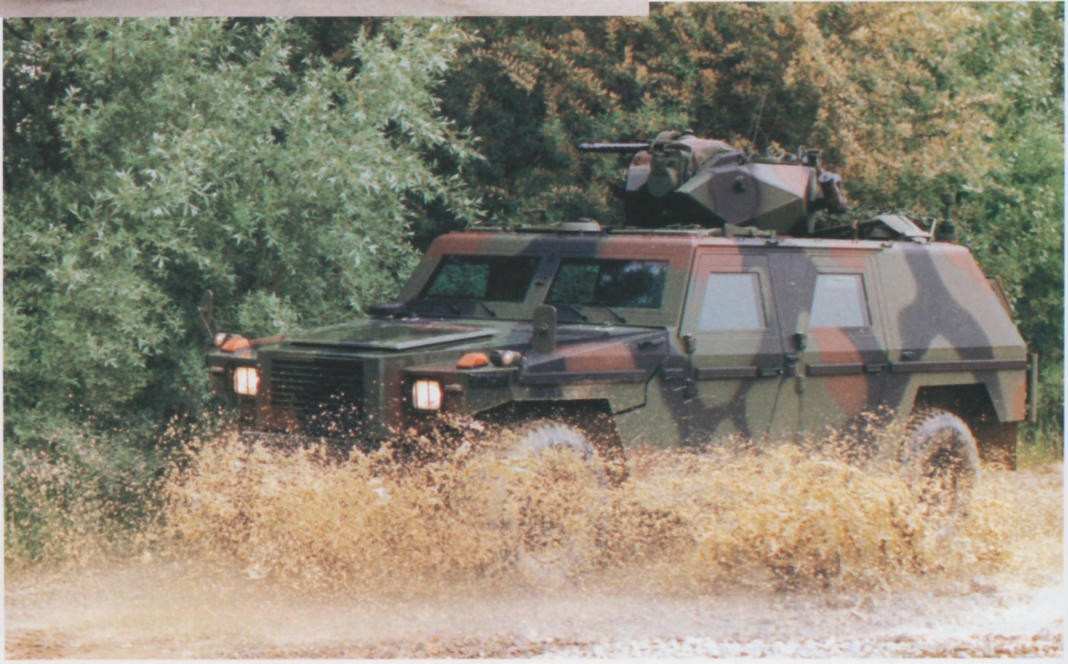
The number of smoke dischargers on the various Danish MOWAG Eagle I's vary from four, which can either be mounted on the left or rear of the turret, to eight which includes both options as seen here. This vehicle is part of the Danish IFOR contingent seen in July of 1996. Clearly illustrated is the MG-3 mounted on the right side of the turret. Note the bag under the weapon that collects empty cases while the belt links are thrown to the right.

At the EUROSATORY 2000 show in Paris, MOWAG displayed the MOWAG Eagle II that is based on the M1113 Expanded Capacity Vehicle HMMWV. Rather than the MBK 2 turret, it is fitted with a higher roof for observation and reconnaissance purposes. In addition, the vehicle is fitted with a mast on which a day and thermal imaging video observation system is mounted. The vehicle is currently in production for the Swiss Army. The first order consisted of 120 vehicles, which would be delivered from mid 2001 onwards.

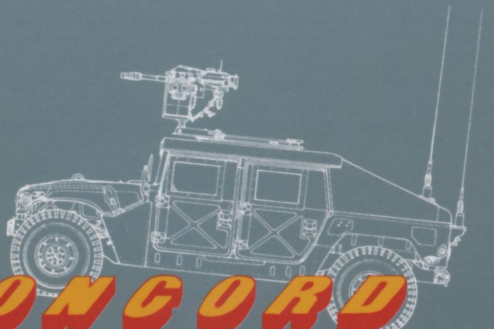




The first EAGLE vehicles issued to the Swiss Army were 154 MOWAG Eagle I's, which are based on the M1097 Heavy HMMWV chassis. The second run was 175 MOWAG Eagle II's based on the M1113 Expanded Capacity Vehicle HMMWV. The only distinguishing feature is that the rear side doors of the Eagle II have larger bulletproof windows. (MOWAG)



This rear view of a Swiss Army MOWAG Eagle II shows the large armor protected cargo compartment. Note that the bulletproof windows cannot be lowered. To keep their troops cool in hot climates, the Danish Army ordered their Eagles to be equipped with air conditioning systems. The crew and engine compartment of all Eagle versions are protected against 7.62mm steel core bullets fired from a distance of 100m, 7.62mm ball ammunition fired from a distance of 30m and 5.56mm ball ammunition fired from a distance of 30m. (MOWAG)



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